THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXIX. No. 717.] LONDON, FEBRUARY 6, 1877. [29TH YEAR.] Price 6d.

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SILVER MEDAL, PARIS EXHIBITION, 1867.

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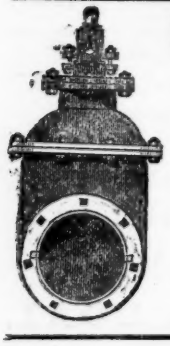
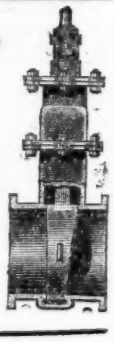
TELEGRAPH TUBES OR POLES, &c., &c.



C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves have taken the place of the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

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By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

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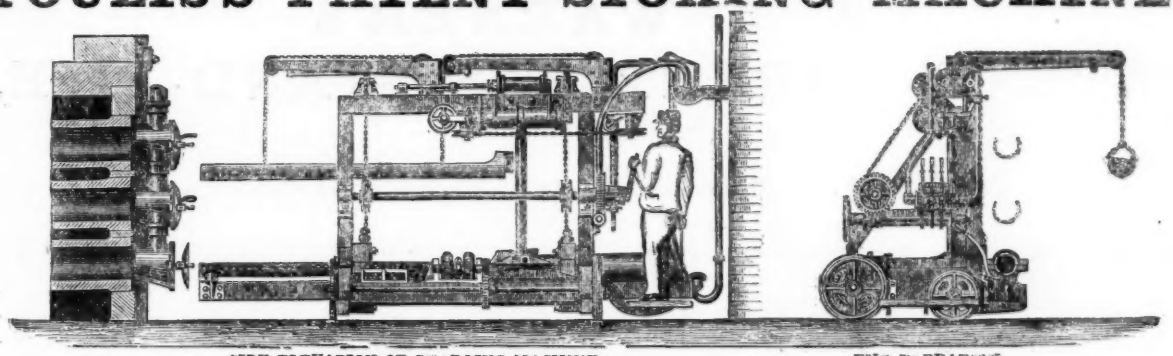

SIDE ELEVATION OF CHARGING MACHINE. END ELEVATION

(The Drawing Machine will be Illustrated in next week's Advertisement.)

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STATION-METERS AND GOVERNORS, STREET-LAMP METERS, BOXES, AND REGULATORS FOR THE AVERAGE METER SYSTEM.

Attention is called to their Dry Meters in Wood Cases, as used by the principal London Gas Companies. These Meters are especially suitable for seaport towns and for export.

The Company repair or convert every description of Wet Gas-Meters to De Castro and Burton's Patent.

HODGE & CO.'S

IMPROVED VENTILATING SUN-LIGHTS

WITH TALC REFLECTORS AND SELF-ACTING VALVES TO PREVENT DOWN-DRAUGHT;

VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.

Ormolu, Bronze, & Crystal Gaseliers;

MEDIÆVAL CHURCH WORK AND CORONÆ

COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;

COLUMNS, BRACKETS, & STREET LANTERNS;

BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.

GAS ENGINEERS,

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Drawings and Prices upon application.

W. J. WARNER'S

PATENT MARKET GAS STAND-PIPE,

MANUFACTURED BY

MESSRS. LAMBERT BROS., WALSALL.

This removable Service or Stand Pipe is suitable for lighting markets and other places, for taking pressures, or for any purpose where only occasional or periodical additional public lights or connexions are required.

The apparatus consists of a vertical pipe, the lower end of which is fixed to the main or collar, and the upper end to a box like a common syphon-box. Into this box is fastened a plate having a plug or valve thereon. The valve or barrel is fitted to a fixed seat or plug capable of turning upon it, and is square on the outside, and of such size as to fit a collar made to slip over it, the joint between the collar and the plug being made gas-tight by the former being forced down upon an india-rubber washer, by certain projections coming in contact with other projections formed in the interior of a cap or cover which surrounds the valve and collar before described. The top of the cover has a round hole with a notch or key-way on its opposite sides to admit of the projections or feathers on the collar passing through and on to the plug. To the collar is fixed the stand or service pipe, which is provided with an ordinary stopcock and gas-burner or pressure-gauge at its upper end. The action of the apparatus is simple. When it is desired to make the attachment, a service or stand pipe furnished with a collar, as described, is thrust down through the cap or cover, and, on being turned, will fix or jam itself tightly, so as to remain firmly upright, and at the same time turn on the gas from the main beneath. The action of removing the pipe effectually shuts off the gas, thereby ensuring great security against fraud, and loss by leakage.

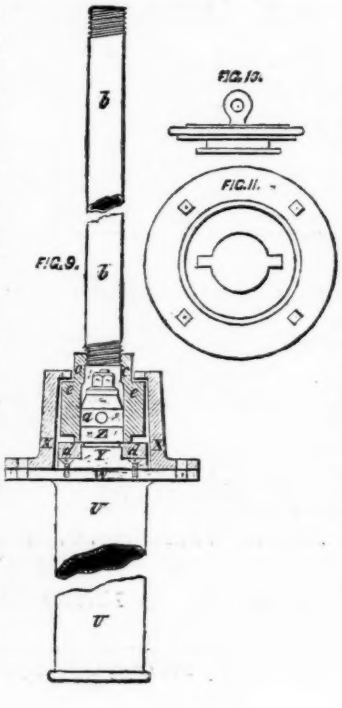

Fig. 9 represents the arrangement for the attachment of removable market or other gas stand-pipes. The view is a side elevation and part section. To the top of the service, U, is fixed a plate, W, and upon that is fastened by bolts the case or box, X. To the plate, W, is also fixed, by screws, the plug or valve, Y, and upon this plug the barrel Z is free to turn. That part of the barrel marked *a* is square. The stand-pipe, *b*, has attached to its lower end the collar, *c*, which is square in the interior, so as to slip over and turn the barrel by the square part, *a*, until the hole in the plug and that in the barrel coincide, when a gas-way will be established between the service, U, and the stand-pipe, *b*. A gas-tight joint between the collar, *c*, and the plate of the plug or valve, Y, is made by the former being forced down upon an india-rubber washer, *d*, by the upper part of the feathers, *e*, of the collar, *c*, coming in contact with inclined projections cast on the inner side of the box, X.

Fig. 10 is a plan of the top of the box or case containing the valve.

Price 15s.

Notice to Gas Companies.

THE "LONDON" STANDARD BURNER,

"GAS REFEREES MODEL,"

For 14-candle and 16-candle Gas, as certified by the Board of Trade.

This Standard Burner, for verifying the illuminating power of 14 and 16-candle gases, has been re-adopted by the Corporation of the City of London and the Metropolitan Board of Works.

Vide **"The Gaslight and Coke Company's Act, 1876";**
"South Metropolitan Gas Company's Act, 1876"; and
"Commercial Gas Act, 1875".

The Metropolitan Gas Referees have re-verified and deposited Models of the Burner with the Board of Trade, which have been duly certified. One of them has now to be deposited with the Warden of the Standards.

As soon as this is done, I shall be in a position to supply Copies of the Standard Burner, engraved in accordance with the instructions of the Board of Trade, enclosed in Mahogany Box with Glasses complete.

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RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES.

FUEL-MACHINE, for Compressing Breeze and Tar.

WASHERS, SCRUBBERS, and PURIFIERS, that Economize Space and Cost.

N.B.—Pamphlet, with Eighteen Illustrations of the foregoing, with letterpress on the construction of Gas-Works, post free, 2s. 6d.

THE "RELIABLE" STEAM-PUMP

Is the only Pump that will Pump Tar and Thick Fluids successfully.

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ETC., ETC.,

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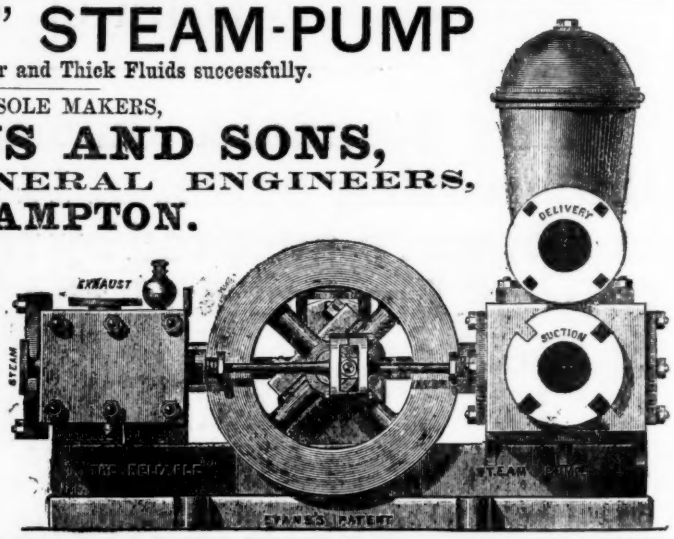
MAKERS AND PATENTEES OF PUMPS OF ALL KINDS.

CATALOGUES ON APPLICATION.



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IMPROVED HYDRAULIC MACHINERY,

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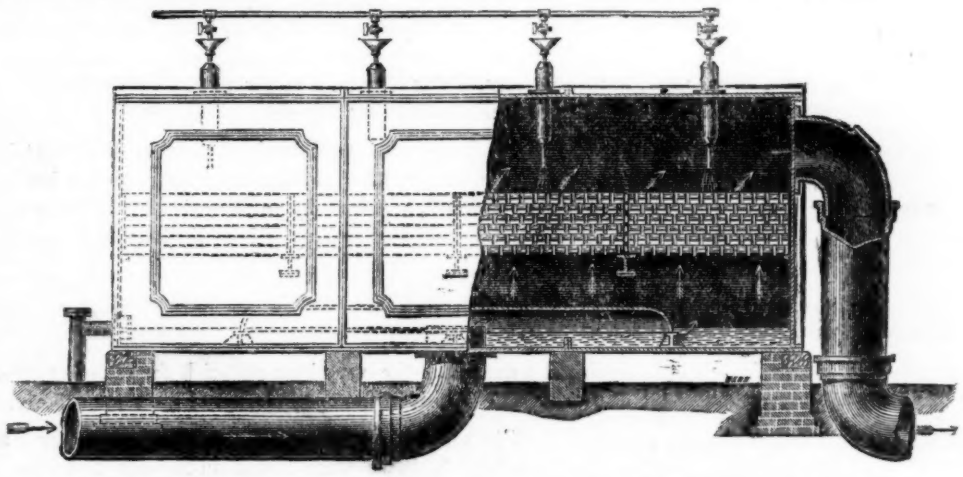
SAVILLE'S

SELF-DISTRIBUTING GAS SCRUBBER-WASHER.

PATENTED IN

GREAT BRITAIN, FRANCE, BELGIUM, PRUSSIA, AUSTRIA, & UNITED STATES.



MECHANICAL ARRANGEMENT.

The Washer Tank contains a large bottom chamber, into which the Gas is freely admitted through an ordinary full-way inlet-pipe, passing first under an inverted vessel which removes any Tar remaining in the Gas after leaving the Condenser; it then rises slowly over the whole surface, CONTAINING AN AREA OF ABOUT EIGHT TIMES THAT OF THE INLET-PIPE, through equidistant spaces in a series of Self-Sealing Water Troughs, arranged in tiers, dividing itself and passing through the various dips until it reaches the upper chamber, and from thence through the outlet-main.

The washing liquid being CLEAN WATER is admitted by the Syphon inlets on top of Tank to the upper row of troughs, running through each successive tier, and becoming impregnated with the impurities extracted from the Gas, gaining strength at each dip on its descent, and finally passing off by the outlet syphon at the bottom.

It will be observed that in this Scrubber-Washer the Gas comes first in contact with THE STRONGEST LIQUOR at the bottom, and passes through WEAKER LIQUOR at each successive tier, until it issues through CLEAN WATER into the upper chamber; hence the true principle of Gas Purification by Washing is simply and automatically effected.

ADVANTAGES.

Great economy in first cost and foundations.
Great saving of other purifying apparatus and material.
Occupies little space, and stands only a few feet in height.
Being entirely self-acting, requires no motive power either for purifying or distributing.
The Gas is washed several times in ONE vessel, each time in liquor of a different strength, ultimately passing through CLEAN WATER.
Produces liquor of any required strength by once passing through.
Can be fixed (if desired) at any elevation to permit Contractors' tanks being filled without the expense of pumping.

One of these Scrubber-Washers has been in successful operation for the past twelve months at the Sowerby Bridge Gas-Works, and they are now being erected at the Corporation Gas-Works, Adderley Street, Birmingham, and at the Phœnix Gas-Works, Vauxhall, London.

Prices and full Particulars on application to

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TO GAS ENGINEERS AND MANAGERS.

It having come to our knowledge that a report is in circulation, spread by some unprincipled person or persons, that the cases of our larger-sized Meters are made of Galvanized Iron, we think it only fair to ourselves, and just to our customers, to say, that we never have used, in making any of our Meters, a single pound of *Galvanized Iron*, or any other *cheap* and *inferior material*, and this can be easily seen by opening any of them.

The cases of our large-sized Meters, from 20 lights and upwards, are all made of the very *Best Best Patent Alloy*, which is nearly double the price, and will last more than double the time, of some other material that has been and still is very largely used for the same purpose. And our experience, acquired by an extensive use of it for upwards of 30 years, enables us to say with confidence that no other metal in use for the purpose is so little liable to corrosion from the action of the gas.

We have now in use a Meter made in 1848, and therefore 29 years old, the case of which is made of Patent Alloy; the Meter is still in perfect order, and shows no signs of decay.

The utmost care is exercised by us in selecting none but the very best materials for all parts of our Meters; much of it is made *expressly for us*, as it is not possible to obtain it in the open market of the same superior quality.

The great fall in the price of all materials used in making our Meters has enabled us to give an increased discount, thus giving our customers the benefit of the fall. This we were bound in fairness to do, as we raised the price of our Meters four years ago, when the price of all metals went up.

It will be our constant endeavour, by using none but the best materials, and employing the most skilful workmen, to maintain the high character our Meter has hitherto borne.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF PATENT

WET & DRY GAS-METERS,

STATION-METERS WITH PLANED JOINTS,

GOVERNORS, PRESSURE REGISTERS, GAUGES,

AND EXPERIMENTAL APPARATUS,

STREET-LAMP METERS,

AND REGULATORS FOR AVERAGE METER INDICATION.

METERS FOR MEASURING WATER.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

J. P. R.—*It is not correct, if stated by Sir E. Beckett in his book on building, that "gas tar rusts iron very quickly instead of preserving it." It is a well-known fact that gas tar is a preservative of metal as well as of wood.*

A Lover of Free Trading.—*It does not appear to us expedient to publish your letter. Doubtless such cases exist, but we hope they are rare.*

H. W. and V.—*The information you require can be obtained from any respectable gas engineer.*

N. T.—1. *The Gas-Works Clauses Act*, 1847, *and the Gas-Works Clauses Amendment Act*, 1871, *contain all the general legislative enactments applicable to the case you name.* 2. *The air in the gasholder, at its lowest, must be removed by displacement.* 3. *You may use cannel in a separate retort, bearing in mind that cannel charges are shorter than those of common coal—the two gases will mix in the holder.* 4. *Perfectly clean gas would not become foul if passed through a third purifier which was soiled; but gas containing carbonic acid, if passed through a foul lime purifier, would take up sulphuretted hydrogen.*

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 6, 1877.

Circular to Gas Companies.

The half-yearly report of the Chartered Company, which we published in our last number, and the statements of account which we print to-day, constitute together a most interesting and important document. The gigantic undertaking works with the utmost smoothness, and the fear that some entertained, or professed to entertain, that the many parts of the huge concern could not be easily organized into a harmonious whole, may now be dismissed. How vast the undertaking is may be gathered by a careful study of the figures in these accounts; and, although the story may be trite in the estimation of some of our readers, yet, for the information of others, it may be useful to quote some figures, to show the immense dimensions that the Company have attained. When these accounts were closed, the paid-up capital of the Company, share and loan, amounted to the enormous sum of £8,101,486. We are quite justified in calling this amount enormous for a Gas Company, but it is, of course, small when compared with what is engaged in some of our large railway undertakings. When the capital of a Gas Company is stated, one of the first questions which arise in the mind is, what it would fetch if a purchase, compulsory or other, were proposed, as may possibly be the case here before long. We make only a rough guess when we say that if bought up to-morrow the undertaking would be worth, to the Metropolitan Board of Works, or whatever authority might become the purchaser, about twenty millions of money, and would be cheap at the price. The revenue of the past half year amounted to no less than £1,181,000, and it yielded a gross profit of £409,497. It results that when all interest and dividends have been paid there remains, as a consequence of the half year's working, a balance of undivided profit amounting to £43,426. It will be seen that the balance brought forward from the previous half year, and some of the profit of the past half, have been expended in commuting the annuities payable under the several amalgamation schemes. The step taken by the Directors to get off the annual charge for these annuities has been most wise. They figure in these accounts for no less than £10,369, a sum considerably smaller than appeared under the same head in the accounts of the previous half year. In the next accounts we shall find that the charge has undergone a very much larger reduction, and is, in fact, rapidly disappearing.

No direct appropriation of the undivided balance could be made, because the present Act forbids any addition to the reserve-fund while the Company are charging the initial or standard price. Now, however, that a reduction of threepence per 1000 feet has been made, the Directors will have power to place the amount to the credit of a reserve-fund.

Turning to the details of manufacture and distribution, we find that everything is proceeding in the most satisfactory manner. The quantity of coal and cannel carbonized during the half year was 504,099 tons, which is a daily average of nearly 3000 tons—a quantity beyond the conception of all but instructed minds. The bulk of gas obtained was over 10,000 cubic feet per ton, and the gas per ton accounted for was something more than 9500 cubic feet, showing a leakage of only about five per cent., which, considering the vast extent of the distributing plant, and the varying conditions of supply, must be regarded as an immense success in management.

The worst feature of the revenue account is the depreciation in the value of coke shown, and as no improvement can be expected until next winter—if we ever get another winter—it is a serious matter for the Company, and we may say the gas consumer also. More of the profit must be made out of gas, and this will prevent a further reduction of the price of the commodity. It is this which will prevent the consumer from deriving all the advantage he might have from cheap coal. But, apart from the advent of cold weather, which is not now to be anticipated for months to come, we do hope for a revival of industry within a short time, which will send up the price of coke. In the meantime, it will be well for the company to exercise caution in the making of contracts.

We are glad to see that the Directors have under consideration a scheme for uniting all their manufacturing stations by means of large trunk mains. It has always seemed to us that this was highly desirable for several reasons, some of which need not here be mentioned. The risk and possibility of an accident, however, such as that which occurred at Dewsbury the other day, is sufficient to show the necessity for making such connexions that, in the event of a failure from any one station, the supply of no particular district would be affected.

An allusion to the Bill the Company are now promoting, in order to get rid of the "sulphur" difficulty, was natural, and, indeed, necessary. The Directors express a hope that the measure they have brought forward will receive public support. So far as the metropolitan authorities are concerned, they will be disappointed, for we believe it will be opposed both by the Corporation of the City of London and the Metropolitan Board of

Works. It does not follow, however, that the Bill will be rejected; but it will involve a serious discussion before a parliamentary committee, which we wish could be avoided. We shall not now attempt to anticipate the course the dispute will take; but it may be accepted as certain, that it will involve points of great interest. We shall miss the once familiar faces of old disputants when the question was raised in former years, and, as we have said, we shall not pretend to predict the result of the coming inquiry.

Oddly enough, the "sulphur" difficulty has, as another column shows, turned up in Canada. The General Act of the Canadian Legislature, against the stringency of which the Gas Companies protest was, we rather think, based, so far as the conditions of purity were concerned, on the Metropolis Gas Act, 1860, which prescribed a maximum of sulphur of twenty grains in one hundred feet of gas. With such conditions, the Canadian Gas Companies find it difficult, if not impossible, to comply, and hence the earnest remonstrance we publish. The "protestors" are not particularly fortunate in their illustrations. Dr. Versmann, we believe, based his calculations on a gas in which he discovered only an average of six grains of sulphur in one hundred cubic feet—a gas of which no living soul would think of complaining. Dr. Odling's argument, that the discomfort felt in rooms where gas is burnt is due to carbonic acid, may be taken for what it is worth, when it is remembered that carbonic acid does not deposit oil of vitriol on fabrics and materials which are susceptible of being damaged or destroyed by that corrosive agent. That much unnecessary fuss is made about sulphur in gas, every one who has thought over the subject well knows. Still, as we have many times remarked, enough is known of the consequences of its presence, to make it the clear duty of all Gas Companies to keep as much out as they can. The ammonia difficulty, we might say, is peculiar to Canada. We, in England, know well the mischief it does, and, further, how profitable it is to take it out of gas. But at present the almost virgin soil of Canada does not require much manure, and the virtue of sulphate of ammonia is not yet recognized in the Dominion. The notion that the ammonia in the gas, submitted to combustion, acts as a neutralizer to the sulphuric acid formed, is not original in Canada. We have heard the same story in this country from people who forget that ammonia may possibly be burnt to form *aqua fortis*, and so rather add to the corrosive action of the products of the combustion of coal gas. We sincerely sympathize, however, with our Canadian brethren under their difficulty. We object entirely to hard and fast lines of legislation. Gas Companies should everywhere stand on their merits, and only be compelled to do the best they can under the circumstances in which they are placed.

The report of two of the Metropolitan Gas Referees on the alleged nuisance at the Fulham Gas-Works must have been read with much interest. From that report we draw the natural and inevitable inference that the complaints made have grossly exaggerated the actual state of affairs. We are hardly inclined to agree with the Referees that the fine dust, carried, it may be, a mile from the works, occasions the complaints—we will not say causes the nuisance. Our own experience induces us to suppose that such impalpable dust, even if it consisted at first of sulphide of calcium, would, in the space of a very short time, and the limits of a very short distance, by rapid oxidation, be converted into inodorous sulphate of calcium. Everybody knows how rapidly foul lime "weathers." We have seen an immense heap of it, the emanations from which did not discolour a gate covered with lead paint not fifty yards away. The suggestions of the Referees are, however, well deserving of attention. Mr. Evans's plan is particularly worthy of adoption. On theoretical grounds we might object to the wetting of the contents of the purifiers, but, as we have had no practical experience with this plan, we make no objections to it. We only hope that the advice of the Referees will be followed, and that we shall hear nothing more of the complaints.

We publish to-day the report of Mr. H. Woodall, the able manager of the Leeds Corporation Gas-Works, on the proposal of the Gas Committee to increase the illuminating power of the gas by two candles. It will be seen that Mr. Woodall agrees with us in the opinion, that to do so would be a pure waste of money. We shall not follow his calculations, nor repeat his very ingenious argument. We take our stand on the broad proposition stated in the last paragraph of the report—viz., that supposing the proposal of the Gas Committee carried out, the Corporation would spend £10,000 a year in doing, very imperfectly, what each consumer could do for himself more perfectly, by the expenditure of a few pence. To our minds, it would be very much better if the Corporation spent a few hundreds in taking a shop in Briggate, where they could exhibit a number of good and bad burners in operation, providing, at the same time, an intelligent attendant, who could explain matters to all inquirers. Such a plan is found to answer by the Paris Gas Company, and the lectures and illustrations of Mr. M'Crae recently quieted all complaints in Dundee.

Our readers know that the Corporation of Lichfield are very anxious to acquire the undertaking of the Gas Company, and, in order to do so, have applied to the Local Government Board for a Provisional Order. There seems, however, to have been some informality in the application, which, therefore, will stand over for this session.

The resolution adopted by the Town Council of Salford to expend £160,000 in amending and extending their gas undertaking, was not carried without some acrimonious discussion. The gas undertaking is, to say the truth, in a very bad way. It barely pays its expenses, and the ratepayers of Salford have the mortification of seeing across, on the other side of the river, a Corporation who sell gas very much cheaper, and make a large profit. The cases are not at all analogous, but there is something in the difference which might excite suspicion. Hence hints of "corruption," and the statement made by an Alderman, that he must hold his tongue, or otherwise what he might say would be actionable. We do not know much of Salford, but we understand that the gas-works have been much neglected, and that long and extravagant coal contracts have been made. The neglect may have arisen from errors of judgment, the long and high-priced coal contracts, or from some other cause. We have, however, nothing to do with either. We simply put the case before our readers in order that they may see that it is not every corporate gas undertaking which works profitably and smoothly. We honestly believe that in most cases the fault lies with a "committee," composed of individuals who know nothing whatever about the business they have undertaken, and whose ignorance only perplexes the managers whom they affect to control and guide. We might say a good deal on this subject, but we may conclude with a repetition of this general advice to Corporations with gas undertakings: Select a good manager, pay him liberally, and hold him responsible for everything. To ratepayers we would say: Trust as little as possible to committees who sit with closed doors. What is thought in Salford may be gathered from the following extract from a leading article in the *Salford Weekly News*:—"Alderman Lee says the management (of the gas "undertaking) has been such as to 'verge upon criminality.' "We do not go so far as that, but we do not hesitate to say that "the gas-works of this borough have, for years, been managed "quite as vilely as were any of the many municipal offices in "New York. People talk about Americanizing English insti- "tutions; but, whatever might be done in that respect, we could "not possibly have a much worse state of thinge in this country "than that which in some towns exists already. What Alder- "man Lee was 'driving at,' as the phrase goes, when he said "'he should be sorry to say anything respecting the manage- "'ment in the past, for fear that he should say something "'actionable,' we can only surmise. But, if there has been "something done by anybody which was not justifiable, why "has it been connived at and passed over? The truth is that "the gas department of the borough seems to have been worked "either by committees and men, or both, who did not understand "or know what it was they were doing, or by committees and "men who neglected their duty to the ratepayers. It is abso- "lutely monstrous—we might use a much stronger adjective "than this and still be within bounds—that in an age of "scientific improvement and discoveries, and we will add of "cheap coal, the gas-works of this borough, with a capital of "nearly £127,000, have not this year yielded the ratepayers one "penny of profit."

Water and Sanitary Notes.

THE proposal, or rather the suggestion, is once more made, that the Metropolitan Board of Works shall take over the undertakings of the several Metropolitan Water Companies, and continue the supply of water to London. What advantage would result therefrom to the Metropolis no one professes to know. There would seem to exist a general belief that private water-rates would be lower, as they probably would be if the Board obtained possession of the undertakings; but then, in all probability, we should have to submit to a considerable "public "rate," and the ratepayers would stand in just about the same case. The actual water-rate would not be altered, unless, indeed, it was somewhat increased, which would be the far more probable result of the transfer. Be that as it may, however, a

committee of the Metropolitan Board have once more to consider the advisability or not of purchasing the London Water Companies. It will probably be several months before we learn the result of the lucubrations of the committee, for the Board can do nothing in this session of Parliament; and, according to Mr. Sclater-Booth, the Government have so much domestic legislation under consideration, that they have no time to think of anything—not even the reform of our local government institutions. They have enough in their pigeon-holes at present to furnish them with occupation for many sessions to come, so we may fairly expect that the Metropolitan Water Question will remain in abeyance. Still, as both the Metropolitan Board and the Corporation of London have the water supply under consideration, we may remark on two points which must come under discussion. First, the rate for a water supply. It is perfectly clear that, wanting a perfect water-meter, the charge for a supply must be based on the rateable value of the premises, which must, we candidly admit, represent the supposed capacity of the tenant to pay, rather than the value of the water consumed. If any committee of the Metropolitan Board or the Corporation of London can devise a more equitable system of payment, we shall be happy to give it our countenance; but, having looked at the matter from every point of view which has occurred to us, we fall reluctantly back on the rateable value as the only one at present available. Then, as regards purchase. We have said, over and over again, that the Metropolitan Water Undertakings can any day be bought up, if a proper price will be paid for them. Their worth, to-day, is about twenty-five millions, and they could not possibly be bought for much less. But supposing them purchased by some authority or other, then would come the question—which some parties are interested in keeping constantly before the attention of the dismal part of the metropolitan public—of the substitution of other sources of supply. Any one of the schemes at present before us would cost from five to ten millions—and some would certainly be more expensive—to carry out. Thus we may assume that, let whatever change happen, the Metropolis would have to rely on the present sources of supply. That no better could be found we confidently believe; and, further, we recognize the fact that nothing beyond careful filtration is required to make the water safe for distribution. *The Times*, we see, has taken Professor Bischoff under its wing. That accomplished chemist has a patent for filtering water through what is called "spongy iron." We hardly know what is meant, and we forbear from making jokes, which must necessarily be bad; but this material, whatever it may be, is said to remove perfectly all "germs" from water. Scientific men, or men of science—Dr. Frankland among them—have hitherto induced us to rely on animal charcoal as an effective filtering medium. But it seems that animal charcoal somehow or other breeds worms, so that we have for the perfect purification of water to rely solely on "spongy iron." *The Times* confers an immense favour by making this announcement to the universe. When all the water supplied to London is filtered through "spongy iron"—well, Professor Bischoff will not be dissatisfied, and no doubt *The Times* will be perfectly satisfied.

Water affairs at Richmond (Surrey) can hardly be said to have much improved since we wrote last week. The work of connecting the houses with the mains goes on slowly. It has been endeavoured to account for the laziness of the workmen by the assertion that they are bribed to be idle by the agents of the Southwark and Vauxhall Water Company. We do not for a moment believe in the truth of the statement, but some of the innocent inhabitants of Richmond do. What is really wanted at the present moment in Richmond, to stir all parties into activity, is a "good" fire. There would be no water wherewith to extinguish it, and if a large part of the ramshackled old town were burnt to the ground, none but the suffering tenants or insurance companies would have reason to regret it. We have reason to believe that a great part of the water now supplied to Richmond is taken from the Thames, about half a mile below the last outlet of the Richmond sewage system. It is received, we are told, directly from the river into the artificial lake in Kew Gardens, and from thence is pumped to a filtering-bed and reservoir in Richmond Park, and thence supplies a Royal residence and the houses of some officials. This water, we are told, though taken from the Thames, not far from a sewer outfall, is reputed as quite free from "previous sewage contamination." As yet we do not know whether "spongy iron" is the medium through which the water is filtered.

Reductions in the Price of Gas.—The Northampton Gas Company have made a reduction of 8d., to take place from Christmas last—the price is now, therefore, 3s. 6d. per 1000 cubic feet.

WATER SUPPLY OF CITIES AND TOWNS.*

First Notice.

Few works have come under our notice of greater professional importance than that on the water supply of cities and towns by Mr. Humber, and very few indeed have given us greater satisfaction in the perusal.

In the preface it is stated that the work was suggested, not so much by any deficiency in published information on the subject of which it treats, as by the entire absence of any English treatise on water supply, of extent and comprehensiveness adequate to the importance of this branch of sanitary engineering. This sentence shows fully the purpose and scheme of the author, and well indeed have the details of the work been considered and matured.

We have not been hasty in our examination of this volume, and we have been well repaid by finding in it the most complete information that can be desired on that most important subject, water supply, which is at all times one on which we feel bound to enlarge, and which, in periods of drought, takes such strong hold on the public mind.

An introductory historical sketch is followed by two grand divisions, the one embracing what is called a theoretical division, and the second the practical division. To the first are appended various formulæ necessary for the practical engineer, and to the latter numerous illustrations from executed works.

In the history of this subject allusion is made to Roman wells, such as that we have seen at Pompeii, and may we add that wells attributed to the Romans exist on the line of the Ermyn Street, a few miles north of Lincoln. We have brief but satisfactory particulars of Roman covered reservoirs at Constantinople, and also of the tanks in India, constructed previous to British rule. Of the latter, Mr. Vignoles computed that in the presidency of Madras alone there were 53,000 tanks for irrigating purposes, exclusive of smaller tanks, the aggregate length of the embankments being fully 30,000 miles, or double the length of all the railways in the United Kingdom, with more than 300,000 bridges, culverts, and sluices.

What suggestions these facts give to ourselves at this present period, when the country has suffered so much from a deluge of rain, to be followed, doubtless at no distant date, by a scarcity of that precious commodity we are now doing our best to get rid of!

We have a description of the aqueduct for the supply of Carthage, which, after a lapse of more than 2000 years, is used for more than three-fourths of its length for supplying the city of Tunis.

But more important still are the details of the water supply of ancient Rome, described tersely, but yet satisfactorily. We have given to us as a summary that in the time of Nero the aqueducts were of an aggregate length of 255 miles, and supplied an average of 50 cubic feet for each inhabitant per day. So abundant, indeed, was the supply, that Strabo says "whole rivers flowed through the streets of Rome."

Nothing is more striking at the present day, to a traveller in this Imperial city, than its profuse supply of water—reservoirs, fountains everywhere pouring out streams of copious volume.

Quotations are given which show that the Romans were better acquainted with the principles of hydrostatics than has in our day been generally supposed, and which leave the impression that our sole advantage over them is in being able to cast pipes that will sustain a greater pressure.

The supply of Paris is examined in brief but interesting detail from the year 1550, when the inhabitants received a supply of only one quart per day, to the year 1868, when the average of the whole year is given as 46,500,000 gallons per day, or 24·6 gallons per head of the population.

The history of the water supply of London follows that of Paris, and introduces the early supply from conduits, followed by the London Bridge Water-Works, and then of the New River Company.

The mode of distribution, first by lead pipes, then by pipes of wood, and lastly of iron, and we have full details of the different sources of supply, the capacity of the reservoirs, and the size of the mains.

This part of the work is a most useful compilation, and from it we take the following abstract of the daily supply from the different water companies:—

	Gallons.
New River Company	35,000,000
Chelsea Water-Works	8,000,000
Lambeth	10,000,000
Grand Junction	10,500,000
West Middlesex	9,000,000
East London in 1871	20,437,000
Additional since that date	10,000,000
Southwark and Vauxhall	15,000,000
Kent	7,000,000

Giving a grand total of an average daily supply of 126 million gallons for this great Metropolis.

Note.—These round numbers are only approximately correct, as will be seen by comparison with the average daily returns as given in Major Bolton's reports for all the companies during the year 1876, which we append.

* "A Comprehensive Treatise on the Water Supply of Cities and Towns." By William Humber, Assoc. Inst. C.E., Mem. Inst. M.E. London: Crosby, Lockwood, and Co., 1876.

Average daily supply—

	Gallons.
January	112,034,841
February	110,394,813
March	110,441,128
April	114,316,265
May	121,146,297
June	123,192,994
July	137,135,102
August	134,139,552
September	121,622,500
October	117,228,394
November	112,638,531
December	110,454,197
	1,424,744,614

Average for the year, 118,728,718 gallons daily.

Following this come the several schemes which resulted from a Royal Commission, appointed in the year 1866, to ascertain "what supply of unpolluted and wholesome water can be obtained by collecting and storing water in the high grounds of England and Wales, and to report on those best suited for the supply of the Metropolis and its suburbs."

Particulars are given of five engineering projects submitted to the Commission, as follows:—

Mr. Bateman proposed to collect water in reservoirs in North Wales, near the sources of the Severn. The distance the water would have to be brought was a little more than 180 miles, and the conduit, as designed, was capable of conveying 230 million gallons per day, at an estimated outlay of £11,500,000.

Messrs. Hemans and Hassard proposed to supply the Metropolis from the Cumberland lakes, at a distance of 240 miles, estimating the supply at 250 million gallons per day, at a cost of £13,500,000.

Mr. Hamilton Fulton proposed to take water from the upper sources of the river Wye in Mid-Wales, at a distance of 180 miles, giving an estimated supply of 230 million gallons per day, at a cost of £9,000,000.

Mr. Remington introduced a scheme to bring water from the hills of Derbyshire, 135 miles, at a cost of £5,000,000; and Mr. Dale, of Hull, introduced a project similar to the second mentioned above, to bring water from the northern lakes.

In addition to these there are the schemes of Mr. M'Clean, Mr. Bailey Denton, and Mr. R. W. Mylne, and others, which may be stated as being for improving existing sources of supply.

After giving the judgment of the Royal Commission on the question of future supply—"That the River Thames, supplemented, if necessary, by works for storing the flood waters, together with the River Lea and the water obtainable from the chalk from the south and south-east of London, as well as, probably, from the lower greensand, will furnish a supply sufficient for any probable increase of the metropolitan population; . . . that a probable increase of population of 4,500,000 to 5,000,000 may have to be provided; that 200 million gallons per day is the highest demand that need be reasonably looked forward to for the metropolitan supply," &c.—this chapter finishes with allusions to supply, and the quality and quantity of the article supplied, in these words: "In ancient Rome the daily consumption was at the rate of 300 gallons for each individual, so liberal was the use of water for baths and fountains. In the present day, 30 gallons are considered a wasteful quantity; this is the change in the estimate of what is necessary for comfort and for health! This is the progress of the last 2000 years."

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

CXXVII.

MAIN-PIPES (*continued*).

Kay's ball and socket joint (fig. 29) has been used not only under

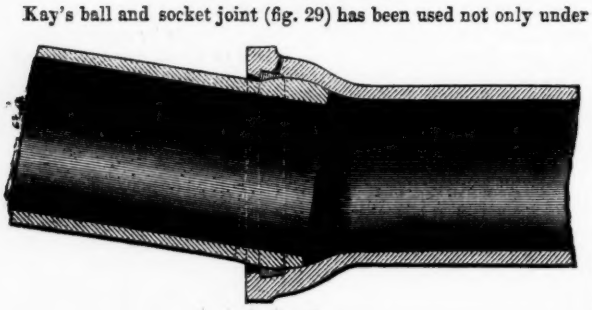

FIG. 29.

the ordinary circumstances of gas distribution, but for crossing rivers and harbours, and it is stated, such is its flexibility, that it can be paid out over the stern of a vessel after the lead is run in and caulked; and, being like a chain, it finds its own bed at the bottom of the river. To draw off the water due to condensation or other causes, a small pipe of the requisite length is inserted through a hole in the accessible portion of the main, to the near end of which a hand-pump is attached. Both the latter description of pipes are manufactured by Messrs. Thomas Edington and Sons, of Glasgow.

Another joint on the ball and socket principle, very similar to Kay's, is that of M. Doré, which will be sufficiently understood from the annexed fig. 30. The space in front of the socket is intended to receive the lead, which is poured in and caulked in the usual manner.

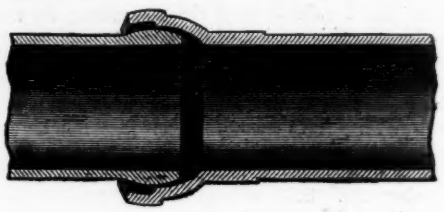

FIG. 30.

Mr. Warner's recently patented joint is shown in fig. 31. This consists of a turned cylindrical spigot, fitting loosely into an ordinary open socket, having a groove cast round its inner circumference. The

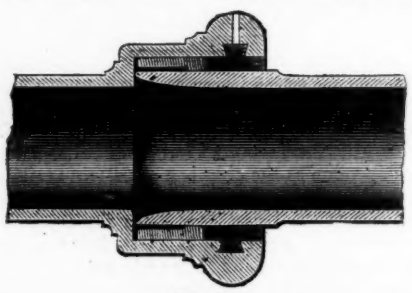

FIG. 31.

method of jointing is as follows:—A flanged sleeve or sheath of thin sheet lead is placed over the spigot; this is then pushed into the socket, and a packing of spun-yarn is caulked round it. After that a coil of greased yarn is inserted, and, a fence being placed against the lip of the socket, molten lead is poured through the hole on the top, as shown, filling up the groove and the intervening space. When this has been caulked, the joint is complete. There are several modifications of the arrangement, but the above explains fully the principle of the invention. The cost of making this is more than that of the ordinary joint, but the patentee claims the superior advantage of great elasticity, without danger of leakage, from his method of connecting.

For repairing broken mains, Mr. Warner employs a thimble in two halves, so arranged that on being placed together against the main, they slide into each other, and wedge themselves round the pipe, a piece of sheet lead being first placed over the fractured part. A packing of yarn is then inserted, and lead is run in, and caulked on both sides. Fig. 32 is a longitudinal elevation of the thimble or collar, and fig. 33 a transverse section through the middle. The

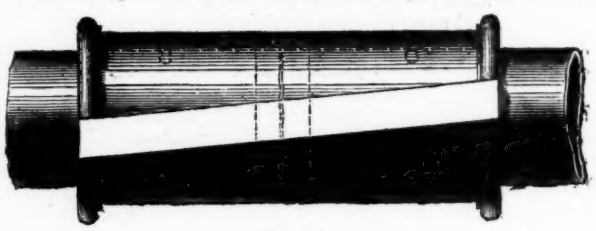

FIG. 32.

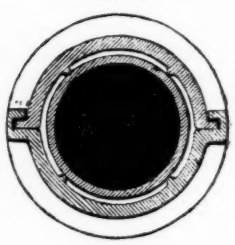

FIG. 33.

studs shown on the inner side of the collar are intended to add strength to the joint; or they answer as chipping-pieces that may be cut to suit the varying external diameter of pipes of the same bore. By the use of these collars, it is not necessary to cut out the broken pipe, as is done in the case of the ordinary thimble.

The following are the various forms of special pipes most commonly in use in the laying of mains. Fig. 34 is the ordinary quarter bend, with socket. Fig. 35 an elbow or knee-piece. Figs. 36 and 37 are eighth and sixteenth bends respectively. The latter are also called obtuse bends. Fig. 38 an S or double bend. Fig. 39 a Tee or branch-pipe. Fig. 40 the same, with the branch at an angle of 45 degrees. Fig. 41 a saddle-branch and socket. Figs. 42 and 43 clip-branches. Fig. 44 a diminishing pipe, and fig. 45 the ordinary thimble, about 16 inches long.

The due proportioning of the distributing mains for the adequate

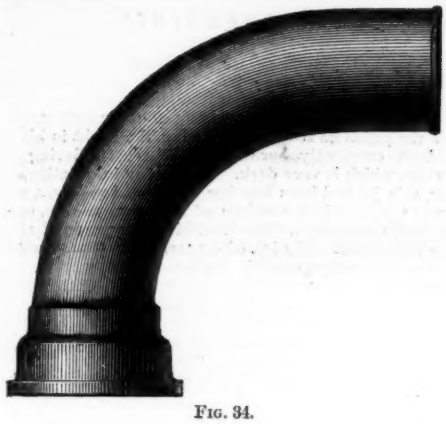

FIG. 34.

FIG. 35.

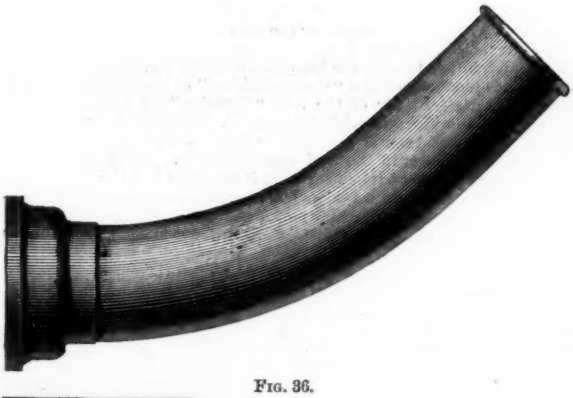

FIG. 36.

FIG. 37.

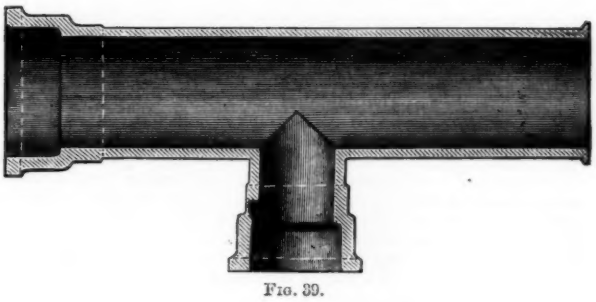

FIG. 39.

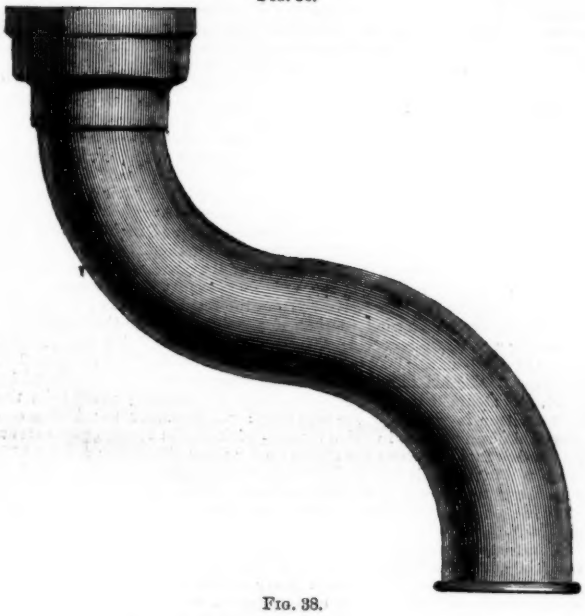

FIG. 38.

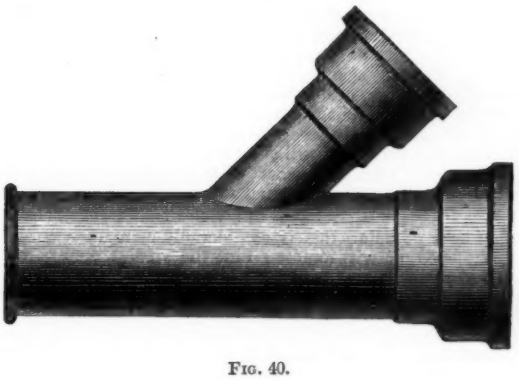

FIG. 40.

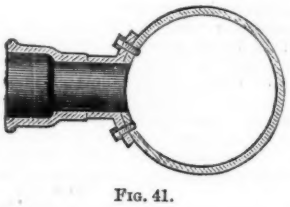

FIG. 41.

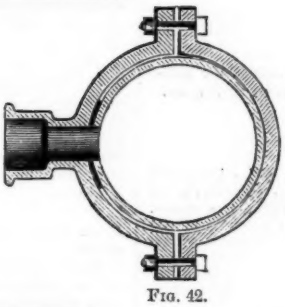

FIG. 42.

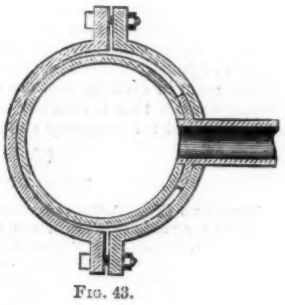

FIG. 43.

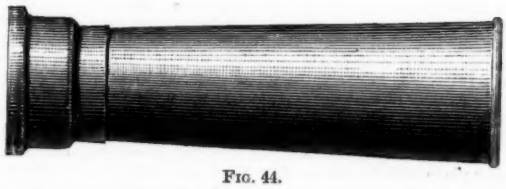

FIG. 44.

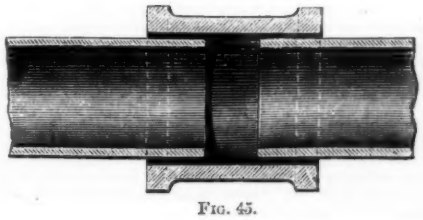

FIG. 45.

supply of a district, requires the exercise of foresight and judgment on the part of the gas engineer. Not only are the immediate wants of the town and neighbourhood to be carefully estimated, but the probable requirements of these for some years to come have to be fully considered and provided for. The mistake is frequently made of canalizing a district with a system of mains of a size altogether insufficient to the obvious immediate or prospective wants of the place. The consequence is, that, in a brief space of time, before the gas enterprise has had time to develop itself, the mains are found to be too small for their work. To remedy this evil, an additional expenditure has to be incurred for enlargements, by which the capital account is unduly weighted; or a resort is had to a gradually augmented initial pressure, resulting in widespread dissatisfaction amongst consumers in the neighbourhood of the works, the amount of whose bills is materially influenced by the excessive pressure, whilst a growing leakage eats up from 30 to 50 per cent. of what might otherwise have been profit. This is no fanciful or exaggerated description; its counterpart, unfortunately, will occur to the recollection of most gas managers.

The leading main from the gas-works is, of course, the largest in diameter; and this should be continued in as direct a line as possible through the centre of the district of supply, without any very sudden transition in size, to the farthest boundary. From this trunk or leading main, the subsidiary mains are made to branch in every direction through the various streets, and the experienced engineer will take care to ensure that these shall be connected together, by full-sized branch pipes, at every possible point of intersection. By that means he will equalize the pressure throughout the district, and be enabled to employ a less diameter of main than without this mutual assistance would be practicable. In rural districts, with a widely extended area of supply, it is not always possible to connect the mains so as to form a network such as we have described; hence, as a rule, the mains have to be of larger size, in proportion to the supply, than in compactly-built towns, and consequently their cost bears a greater proportion to the rental than in the other case.

Mains should, if possible, be laid at such a depth in the ground as to ensure their not being materially interfered with by the weight of the traffic overhead, and the changes of temperature in the atmosphere. The depth of cover from the surface of the ground to the upper side of the pipe should not usually be less than twenty-one inches for the smallest mains, and those above eight inches in diameter should have a covering of two feet or two feet six inches in thickness. In countries where the extreme cold is more severe and of longer continuance than with us, they should be placed at a still greater depth. On the other hand, in tropical climates, where the temperature of the ground at a depth of two feet from the surface is equal to the mean temperature of the air, a greater depth than two feet is unnecessary. A good covering is rendered all the more desirable now that the steam-roller is used in most large towns, and heavy agricultural steam-engines in rural districts. The earth beneath the pipes, particularly if it has been disturbed and loosened, as well as that above, should be firmly rammed in, so as to afford the pipes adequate support, without danger of settlement. No pipe should be laid in position without being first cleared of soil, stones, or other substances that may have got into it accidentally, or been put there from malice prepense. With this object in view, the main-layer in charge of the work should personally examine every pipe when it has been rolled on to the cross supports over the trench. Neglect of this necessary precaution frequently leads to future expense and annoyance.

In wide streets it is advisable to lay two mains, one on each side. The first cost of doing this is considerably more than if only one were employed, notwithstanding that the size of each of the two would be smaller than the single one; but the expense of long services, and the leakage that is apt to arise therefrom, with other disadvantages attending their use, is saved, and this eventually compensates for the extra original cost incurred. In sparsely populated neighbourhoods, the main should be laid on that side of the street or road where the largest number of services will be required.

Cast-iron mains of less diameter than 3 inches ought never to be used. The difference in the cost of these and anything smaller is scarcely appreciable; whilst the loss of gas from fractures at the points of junction of the service-pipes, occasioned by the weakening of the main in drilling, and the still more serious loss throughout the whole district that is entailed in having to maintain excessive pressure to afford the necessary supply of gas, are great and continuous.

(To be continued.)

Richmond (Yorks) Corporation Gas-Works.—Owing to the increased demand for gas in this town, the Corporation, at a large expense, some time since, erected a new gasholder and otherwise extended the works. Now it has been found necessary, owing to the demand on account of the new barracks and other places, to make a still further enlargement of the gas-works, and for that purpose it was resolved at a meeting of the Town Council on the 29th ult. to expend about £1600 in extensions under the direction of Mr. Smith, the engineer of the Darlington Corporation Gas-Works.

Natural Gas.—There are now three gas-producing wells at Beaver Falls, Pa., one of which has been in operation over seventeen years. Two of the wells are nearly 1100 feet in depth, one having been reamed out, and is said to produce about 100,000 feet per day, which is utilized in the cutlery works, except what is used in the gas lighting works, where it supplies about 60 per cent. of what is used. The other well is to be bored out to eight inches. The third well was recently bored, and struck a good vein of gas at 500 feet. This well is to be cased twelve inches, with a small tube inside to continue the boring to a greater depth, while the present product of gas, which is much greater than the other wells, can be utilized.—*American Coal Trade Journal.*

Correspondence.

THE EXPLOSION OF A GAS-METER.

Sir,—In answer to the inquiries put to me by your correspondents, I can only say that all the information I have been able to obtain is the following:—I learn that the gas was seldom or never turned off, as the proprietor of the premises requires it during the night in his nursery. One jet is kept constantly burning all the season during the day in his back shop, which is very dark. On the day in question, the 30th of December, this jet had been burning for about two hours, and while the master was standing in the middle of the shop, talking, one of his lads being behind the counter, but not within three yards of the meter, the explosion took place. The jet, of course, went out at once, as the supply of gas to it was then cut off. I do not think, however, we have yet elicited from your correspondents the true cause of the explosion.

In reference to "R. F.'s" questions, I may state—1st, that nothing peculiar was observed in the burning of the jet up to the time of the accident; 2nd, nothing had been done to the mains or service-pipes for days, if not for weeks, previously; 3rd, the premises are from 1200 to 1300 yards from the gas-works; 4th, there was no oxygen gas in the neighbourhood that day.

S. E.

QUANTITY OF BRICKWORK IN RETORT-SETTINGS.

Sir,—"C. T. S.," in a note under the above heading, which appeared in the Journal of Dec. 26th last, objects to chequered walls in retort-settings, and in support of the less-brickwork-the-better theory, refers to what he is pleased to call a "demonstration" of the correctness of it, contained in the chapter of the new "Treatise," in the Journal of Aug. 14, 1874, in which this subject is treated. Since reading "C.T.S.'s" remarks, I have re-read the article he alludes to, but must confess my inability to discover the said demonstration. There is a theory advanced, which is to be taken for what it is worth; but if a demonstration is "the highest degree of evidence, or such proof as establishes a fact or proposition beyond a possibility of doubt, or as shows the contrary position to be absurd or impossible," then to me it is conspicuous by its absence.

The endeavour to show that, theoretically, retorts ought to be "as thin as a sixpence," and, like Mahommet's coffin, hung between heaven and earth by the neck and heels, by reference to the incrustation of steam boilers, was so conclusively answered in Mr. Newbigging's admirable criticism in the Journal of Oct. 20, 1874, that little remains to be said, except perhaps that, after all, the chief objection to the accumulation of a medium between the shell of the boiler and the contained water is not so much a question of fuel as of danger in burning the plates over the furnace. But since the writer of the article has adduced steam-boilers to, as he believes, strengthen his position, I may be permitted to follow suit, and refer to steam-boilers too.

Mr. R. Armstrong, in his "Rudimentary Treatise on Steam-Boilers," in the Weale series, relates how, in experimenting with a waggon boiler, with the view to lessen the mass of water in it without lowering its level, on account of the side flues, he resorted to the expedient of using filling-up blocks in the water-room, resting on a framework of iron rods laid across the internal stays of the boiler, sufficiently clear of the bottom and sides, when it was invariably found to effect a saving in fuel of from 5 to 10 per cent. He says: "The most convenient articles for the purpose were large fire-bricks, 18 to 20 inches long, 12 inches broad, and from 4 to 6 inches thick. [The woodcuts show them laid with spaces between them.] There can be little doubt that these filling-up blocks have a beneficial effect in producing an uniformity in the evaporation, independently of the effect arising from the displacement of the water, and which may be likened to that of the fly-wheel on the engine, by becoming a sort of reservoir of heat, or regulator of the evaporating power of the boiler. This effect is especially observable if compared to the irregular action of a boiler, with a large inside flue, when fired by hand, the steam being liable to vary very considerably every time the furnace door is opened." He also says: "It is proper to mention one practical disadvantage in using the fire-brick blocks to any great extent. They were found to keep the steam up for some time after the fire was put out, a fact decisive of their economy in a theoretical point of view, yet, owing to the waste of water caused by the steam blowing away after the engine was stopped, there was danger of the water getting too low."

As a further evidence of the natural law so opposed to the erroneous views of which the writer of the "Treatise" article and "C. T. S." are the advocates, I would refer to a letter which recently appeared in an American newspaper, from a correspondent writing from Gottenburg, Sweden, favourably contrasting the Swedish stove, or "*kakelung*," with the American stoves, in the economy of fuel. He writes: "A '*kakelung*' is simply a great stove of masonry, covered with porcelain plates, having flues through which the gases of combustion must pass up and down a distance of 30 to 50, or even 60 feet, before escaping into the air. The quantity of material in the '*kakelung*' is so great that the temperature from one fire (consisting of eight to ten billets of wood, 12 inches long), will not raise the temperature of any part so much that the hands cannot be held on the outside. Two hours after the fire is made, and after the wood has burned up and the flue closed, the '*kakelung*' begins to get warm on the outside, and ten hours later there will not be much difference in the temperature of the stove or the room."

These examples are so entirely in accord with the practical experience of the advantage of transverse or supporting walls in retort-settings, that, from the fuel point of view alone, one wonders how their utility could ever come to be doubted. The brickwork clearly does not annihilate any heat, but very conveniently absorbs and retains the surplus, or so much of it as it can take, during the time the quantity generated in the furnace is in excess of its absorption by the retorts, and beneficially exhales or restores a part of it when the reverse occurs.

Now, when it is remembered that the great absorption of heat by a retort containing a fresh charge of coal is during the first two hours or so, within which time over half the gas is evolved and the coking taking place, and that thereafter the production of gas rapidly lessens, while the retort becomes charged with a mass of highly-heated coke, it

is self-evident that the furnace has very unequal duties to perform during the time the charge is "burning off;" and that any compensating arrangement by which the whole or part of the surplus heat, when there is an excess during the latter part of the distillation, can be retained, to be restored when there is a deficiency during the early part of the succeeding charge, must be beneficial; and the transverse walls, so thoughtlessly condemned, answer that purpose, and, I repeat, would be well worth putting in, if for no other purpose.

But there is another important aspect of the functions of these walls. Every practical man not blinded by prejudice knows that they serve as jambs to prevent pieces of the retorts falling out when they have been long enough in use to become cracked (I have never been fortunate enough to get any of these charmed retorts that do not crack, if heated and worked properly), and I do not think it an over-statement to say that that generally means an additional season's work got out of them.

Gas-Works, Montreal, Jan. 15, 1877. E. S. CATHELS.

P.S.—Since the foregoing was written, the JOURNAL of the 2nd inst. has come to hand, containing the "snarl" of "S. N. A. P.," and a very sensible snarl too, so pungent and pithy in its demolition of "C. T. S.'s" cherished "demonstration," that doubtless that gentleman is ere this converted to the true faith, and so possibly saved from experience hereafter of "highly-heated" gases, the purification of which from sulphurous compounds would certainly not satisfy the Gas Referees.

E. S. C.

Parliamentary Intelligence.

GAS AND WATER BILLS, 1877.

Last week the Examiners reported compliance with the Standing Orders in respect of the unopposed petitions for the following bills:—Middlesbrough Corporation; Rotherham Corporation; Wakefield Gas; Colne Gas; Louth Gas; Sittingbourne Gas; Bishop Auckland District Gas; Ashton-under-Lyne Improvement; Edinburgh and District Water; Carnforth District Water; Glasgow Corporation Water; Stamford Water; Bridgwater Corporation Water; Ramsgate Local Board; Coatbridge Gas; Perth Water; Tunbridge Wells Water; Lowestoft Water, Gas, and Market; Maryport District and Harbour (Gas); Christchurch Gas; Sevenoaks and West Kent Water; Epsom and Ewell Gas; Woolwich, Plumstead, and Charlton Consumers Gas; Stretford Gas.

In the cases of the opposed petitions for the Bromsgrove, Droitwich, and Redditch and the Dublin Improvement Acts Amendment Bills, the memorialists established some of their allegations of non-compliance, which will be reported accordingly.

The petition for the Brighton Corporation Bill was withdrawn.

The consideration of the petitions for the Newport (Monmouthshire) Gas and the Bristol United Gas Bills was adjourned till Monday next.

Legal Intelligence.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

SATURDAY, FEB. 3.

(*Before Vice-Chancellor* BACON.)

In re THE NEW GAS GENERATOR COMPANY.

In this case a petition has been presented to wind up the company, and on its being called on,

Mr. OSWALD applied that the petition might stand over for a week.

Mr. KAY, Q.C., for the company, objected to its standing over.

Mr. OSWALD said that he had only just had put into his hand three affidavits filed the previous day in answer to the petition, and these affidavits he wished to answer.

The VICE-CHANCELLOR: For whom do you appear?

Mr. OSWALD: For the petitioners.

The VICE-CHANCELLOR: Then it must stand over till next petition day.

EXCHEQUER DIVISION.

TUESDAY, JAN. 30.

(*Before Barons* CLEASBY *and* POLLOCK.)

PRICE OF GAS TO EXTRA-MUNICIPAL CONSUMERS.

CORPORATION OF BATLEY *v.* STUBLEY.

This was an appeal from the judgment of the Dewsbury County Court in a case in which the plaintiffs brought an action to recover from the defendants, who are inhabitants of the suburbs of Batley, a sum of £29, being the difference on half a year's supply of gas, between the rate of 4s. 6d. per 1000 feet which the defendants were charged by the corporation, and that of 4s., which the corporation charged those residing within their own bounds. The result of the proceedings at the county court having been in favour of the plaintiffs, the case now came before a superior court on an appeal against that decision.

Mr. GULLY, as counsel for the appellants, explained that the Corporation of Batley some time ago purchased gas-works which had originally been started by a company under powers obtained by Act of Parliament; that the gas-works were situated in the township in which the defendants resided, and which adjoined, though it was outside, the municipal boundaries of Batley; that, under their parliamentary powers, the corporation supplied gas both to the borough and to the township; that they gave out a notice that they would in future charge 4s. 6d. per 1000 feet for the gas all round, both to this township and to Batley, but that as regarded those persons in Batley who took gas from them, they would allow a discount of 6d. in every 4s. 6d. if paid within two months. To the people of the adjoining township, although the gas-works were situated there, the corporation did not allow that discount, permitting it only to their own constituents, which the learned counsel said was putting all the profits of the undertaking into their own pockets—*i.e.*, into the borough funds. His clients in the township not unnaturally complained of that course on the part of the corporation—complained that the people of the township, where the gas-works themselves were, should by this differential charge be made to contribute to the Batley Corporation funds. He (Mr. Gully) contended, on all the circumstances of the case, that the corporation were bound to charge equally all round.

Baron CLEASBY reminded the learned counsel of the terms of the corporation's notice as to the charge of 4s. 6d., which his clients appeared to have accepted.

Mr. GULLY argued, however, that the corporation were bound to supply the gas, and on equal terms—that they had no right to supply it on these unequal terms for their own benefit. It came to this, that they charged people outside the municipal boundaries 4s. 6d., while they charged their own electors, those people who were inside the municipal boundaries, 4s.

Baron CLEASBY: Provided payment is made within a certain time.

Mr. GULLY: Practically it is putting us to a disadvantage as compared with their own constituency, although they are trustees for the whole body, whether constituents of theirs or not.

Baron CLEASBY: The same would have been the case with the company.

Mr. GULLY: That depends on a different Act of Parliament, which I have not considered. It certainly seems contrary to natural justice to make this difference of charge, and put the balance into the borough fund, at the expense of the adjoining township.

After some further discussion on the subject, the Court eventually dismissed the appeal.

GLASGOW SMALL DEBTS COURT.—FRIDAY, FEB. 2.

(*Before Sheriff* SPENS.)

ACTION AGAINST THE CORPORATION FOR CUTTING OFF GAS.

John Guthrie, of 198, Woodside Road, sued the Corporation, acting under the Glasgow Corporation Gas Act, 1869, for the sum of £12.

The grounds of the action were that the corporation had cut off the pursuer's supply of gas in consequence of alleged non-payment of 4s. 7d., notwithstanding that a deposit of 5s. was lying in their hands, whereby he had been deprived of gas, and sustained much inconvenience, expense, and unnecessary exposure to his friends and neighbours.

The defence set up was that the pursuer was not the occupier of the house, but had merely put his name in for it to save a woman who already owed £1 15s. on an old account, and such being the case the gas was cut off.

Evidence was led for both parties, that for the pursuer being to the effect that he was in reality the occupier, and that the woman was merely his housekeeper.

Mr. BOWERS, who appeared for the defenders, wished to assert that this was a case of fraud; and, further, that after the gas had been cut off the pursuer had been using the gas by some means, the meter indicating a consumption.

The SHERIFF, however, thought that the agent should be very careful in making this statement, as it was quite within the pale of libel, and considered that it was very likely that the meter was wrong. His lordship held that the defenders were not justified at all in cutting off the pursuer's gas, on the grounds that the woman, who was not his (pursuer's) wife, was owing an account; and as to his own account, they admitted having a deposit of 5s. The case was not one for large damages being awarded, and he would therefore give decree for 5s., with 6s. for witnesses, as well as court expenses.

HAMPSTEAD POLICE COURT.—WEDNESDAY, JAN. 31.

(*Before Messrs.* MARSHALL, FAULCONER, *and* SMITH.)

CONVICTION UNDER THE CONSPIRACY AND PROTECTION OF PROPERTY ACT, 1875.

John Smart was charged on two summonses, one accusing him of having wilfully and maliciously broken a contract of service with Mr Henry Skoines, who supplied the district of Child's Hill, Hendon, with gas, knowing or having reasonable cause to believe that the result of his doing so would be to deprive the inhabitants of the said district wholly or to a great extent of their supply of gas; and the second summons charged him with wilfully and maliciously breaking a contract, knowing or having reasonable cause to believe that the probable consequence of his so doing would be to endanger human life, or cause serious bodily injury.

Mr. MOORE, who attended to prosecute, stated that the maximum penalty provided by the Act in each case was a fine not exceeding £20, or imprisonment not exceeding three months.

From the evidence it appeared that Mr. Skoines was the proprietor of the Child's Hill Gas-Works, and had the contract for supplying with gas the important district of Child's Hill, Hendon, extending on one side to The Hyde, Edgware Road; on another to Golders Green, Finchley Road; and in a third direction to a house near Hampstead Heath. The defendant was a night stoker in complainant's service, engaged as a weekly servant, at 24s. per week, a week's notice to be given on either side. On Sunday, the 14th ult., he should have gone on duty at twelve o'clock noon, and continued on until six on Monday morning. There had been some previous dispute between him and the complainant, and he had given notice of his intention to leave. On the Saturday, however, he told Elliott, complainant's foreman, who asked him to stay, that he would stay for him but not for Mr. Skoines. On Sunday defendant went to the gas-works but did not commence work, and, after staying about a quarter of an hour or twenty minutes, declined to resume work, and, though warned of the consequences, went away. The result was that the whole work was thrown on the foreman, and there was a defective supply of gas the entire evening. The previous dispute with Mr. Skoines had arisen through defendant absenting himself (through missing a train, as he alleged) on the preceding Sunday, when Mr. Skoines had to do his own stoking in order to keep Child's Hill Church and other places supplied with gas. In consequence of similar conduct by other workmen, complainant had been obliged to pay compensation for damages in two cases. Defendant alleged that he gave proper notice, and only went on Sunday to get the money due to him for Saturday's work.

The BENCH fined the defendant 20s., including costs, or 14 days imprisonment in each case. He was locked up in default.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

METROPOLITAN BOARD OF WORKS.

At the Meeting of the Board on Friday last—Sir J. HOGG, M.P., in the chair—

The Works and General Purposes Committee brought up a report upon the Bill of the Woolwich, Plumstead, and Charlton Consumers Gas Company, recommending that the promoters be informed that if they will adopt the provisions of the South Metroplitan Gas Act of last year, the Board will not oppose the Bill.

Mr. FREEMAN, in moving the adoption of the report, said the present capital of the company was £60,000, and it was proposed to raise additional share capital to the amount of £60,000, the dividend on which was not to exceed 7½ per cent. per annum, and to borrow on mortgage a sum not exceeding £30,000. As the district supplied by this company was in the area under the jurisdiction of the Board, it appeared to the committee that the Board should seek to obtain for the consumers advantages similar to those which were obtained by some of the Gas Acts of last year. Before deciding, however, to petition against the Bill, and to lay the case before a committee of the House of Commons, the committee thought it desirable that the company should be asked whether they would adopt the provisions of the South Metropolitan Company's Act of last year, so far as it related to the sliding scale of price and dividend, the initial price, the illuminating power of the gas, and the mode of raising the additional capital required. The committee accordingly recommended that a communication should be addressed to the company, to the effect that if they would adopt these provisions of the South Metropolitan Gas Act, the Board would not oppose the Bill.

Mr. E. D. ROGERS seconded the motion, which was adopted.

The committee further recommended that The Gaslight and Coke Company's Bill and the Crystal Palace Gas Company's Bill be opposed, and that petitions be presented against them. With regard to these two Bills the committee said: The Bill of the Chartered Company is confined to one point only, that of the purity of the gas, with respect to which the company ask for the repeal of sections 30 and 51 of their Act of last year, by which the Gas Referees are required to ascertain and fix the maximum amount of impurity to be allowed, and the company are subjected to penalties in the event of the impurity exceeding the maximum prescribed by the Referees. If, therefore, the Bill were passed in its present form, the company would be under no obligation to supply the gas as free as possible from the various impurities which are generally found in gas, excepting always sulphuretted hydrogen, the presence of which is prohibited by the Act of Parliament. It appears to the committee to be quite unnecessary to alter the present law upon this subject. It is now the duty of the Gas Referees to prescribe from time to time the degree of purity with which the company can reasonably be required to make and supply gas without occasioning a nuisance to the neighbourhood in which the works are situated, and it may be assumed that the Referees are always ready to consider any real difficulty in which the company may be placed, and any representations which may be made to them on the subject. The Crystal Palace District Gas Company's Bill, which was referred to the committee on the 22nd of December last, is much to the same effect as that of The Gaslight and Coke Company. It is proposed to repeal so much of section 17 of the company's Act of 1873 as provides that the gas made by the company shall not contain more than 20 grains of sulphur, in any form, in each 100 feet of gas. If, therefore, the Bill were passed, the company would be under no restriction as to the amount of sulphur in the gas made by them, a position which the committee consider unundesirable.

Mr. FREEMAN moved the adoption of the report, and the motion, having been seconded by Mr. E. D. ROGERS, was put and carried.

METROPOLIS WATER SUPPLY.

DEPUTATION TO THE HOME SECRETARY.

On Monday, Jan. 30, a deputation consisting of members of some of the Vestries and District Boards, and of the "National Chamber of Trade," waited upon the Home Secretary (Mr. Cross), at the Home Office, with regard to the water supply of London.

Sir C. RUSSELL introduced the deputation, and said there was no need for him to suggest to the Home Secretary the great importance to the inhabitants of the Metropolis that they should have water—one of the first necessaries of life—supplied to them in good quality, quantity, and at a fair and reasonable cost. Under the present Acts the companies were enabled to charge for the water they supplied upon the annual value of the houses. The Acts had been interpreted to mean the gross rateable value of the Metropolis, and the fact existed that in the last 20 or 25 years the rateable value of London had doubled, and they were of opinion that at the time those Acts gave that very vast power to the companies it was not contemplated that so great an increase would occur either in the powers of charge or in the requirements of water. They wish to suggest to the Government, if the companies were amalgamated under some central authority, that there would be such an economy in management at the least, and such other good results would be likely to supervene, that they would be able to obtain a better and more continuous water supply, at a cost which would not be, as it was at present, a severe burden on the ratepayers of London. The difficulty of obtaining a supply of water by meter was very great, the companies refusing to put a meter unless the person wanting it would use 25,000 gallons of water in one quarter.

Mr. ATTENBOROUGH said he was chairman of the sub-committee of the National Chamber of Trade, which had been appointed to take the opinion of the Government as to the wisest course to pursue to obtain relief in regard to the matters complained of in the water supply. At present ratepayers were entirely in the hands of the water companies, who possessed a joint capital of £14,000,000, and very arbitrary powers, which had been obtained by promises that had never been fulfilled. It was a very great hardship on houses of business that they should be rated as if they used water for domestic purposes, and should be charged on the gross rateable value. If the companies were all put under the control of one central authority, such as the Board of Works, he thought purer, more continuous, and cheaper water must result.

Sir J. C. LAWRENCE, M.P., said he was in Parliament when the Water Supply Act was passed, and he contended that the companies put a different interpretation upon that Act to what was intended by Parliament. In the Act obtained by the New River Company, the term domestic use was employed as referring to dwelling-houses, and a clause was inserted giving power to charge £1, £2, £3, or £4 for each closet. There were many commercial buildings in London where there was really no water laid on except for the closets, and yet the company charged for each one of them, and also on the rateable value of the house. That was in entire disregard not only of those who applied for the Act, but of the Legislature, and of the terms and spirit of the general Act of Parliament itself. As regarded supply by meter, he had sat on more than one committee, and the officials of the water companies had always represented that any one could obtain a meter who was content to pay for a certain minimum quantity of water. He was afraid that the companies had absolutely refused in some cases to supply by meter to very large premises occupied by wine merchants and others, on the plea that they considered it to be applied for domestic use, the place not being a manufactory or factory. As to the increase of dividends, friends of his, connected with water companies, had not hesitated to tell him that the reason for this—some five or six years since, when there was talk of their being bought up like the railways and telegraphs—was that their value might be estimated not by speculation, but be ascertained by actual knowledge of the dividends they were paying.

Mr. M'CULLAGH TORRENS said the question they would like to put before the Government was whether joint-stock profits at the expense of the community was not becoming in a certain sense obsolete. In 1852 he sat on the committee, which was supposed to put a suitable check on the powers of exaction of the water companies, by limitation in proportion to the value. At that time the valuation of the Metropolis was 11 millions, and now it was 23 millions, and, therefore, the state of things then contemplated had entirely changed, and now the companies should be put back to where Parliament intended to put them in 1852. If such a check was imposed in any form that was legitimate, immense benefit would be conferred upon the ratepayers.

The HOME SECRETARY said the deputation would not expect him to answer all the questions they had raised. First, they said that the interpretation of the Acts of Parliament was wrong. Of course, he could say nothing about that, as it was a question for the courts of law. Then he understood them to say that in certain cases the interpretation which had been put on them, either by the courts of law or by the companies themselves, was not the meaning Parliament meant to attach to them. So far at least, as courts of law, which determined that Parliament meant what it said as to the interpretation put upon them by the companies themselves, he presumed they had a ready way of trying the matter. If they found that the interpretation was directly contrary to the spirit of what Parliament determined, that was a question which they should bring before Parliament in the usual way. Then they had raised a very large question as to the forming of a central authority for all those water companies. This meant purchasing them. That was a very large question indeed, and he was not at all prepared to say that it was one which would not receive considerable deliberation and attention, but he was not prepared to give an answer on the question. One thing which, to his surprise, they did not mention was fire, which was of vital importance to the public. He understood that question would practically be brought before the committee sitting in the House of Commons at the present moment. It was a subject that had not escaped the attention of the Government; but, as they knew, it was very difficult to deal with, and he could not promise any more.

Mr. ATTENBOROUGH asked whether the Home Secretary would give an opinion as to the prudence of, and whether the Government would support an attempt to borrow money for, buying up the companies. It would take about £14,000,000, which could be borrowed at 3½ to 4 per cent., and that, while giving the companies a very good profit on the capital employed, would be a great relief to the ratepayers. They would be glad if the right hon. gentleman would take the matter into consideration.

The HOME SECRETARY: I am called upon to give opinions on so many matters that do come within my jurisdiction that I do not like to express an opinion on a matter which is entirely beyond my jurisdiction. Indeed, it is very hard to say whether the Government would support you; at any rate, I must not be called upon to give you an answer to that.

The deputation, having thanked the right hon. gentleman, retired.

METROPOLITAN BOARD OF WORKS.

At the Meeting of the Board on Friday last, the Works and General Purposes Committee presented a report, in which it was stated that on the 25th of February, 1876, the Board passed a resolution expressing the opinion that the most effective mode of dealing with the question of the water supply of the Metropolis would be to obtain power to carry out the recommendation of the Royal Commission of 1869 that the water supply should be in the hands of the responsible public authorities, and the committee were instructed to confer with the committee of the Corporation of London to ascertain from the Home Secretary whether the Government would support a measure for the purpose, if it were introduced by the Board and the Corporation. It having been previously arranged with a sub-committee of the Corporation, who had considered this question in conjunction with a sub-committee of the Board, that a recommendation similar to that adopted by the Board should be submitted to the Court of Common Council, in order that the two bodies might, as far as possible, act in concert, the committee on the 29th of March last directed a letter to be addressed to the town clerk, inquiring what decision the Court of Common Council had arrived at. A reply was received from the town clerk to the effect that the matter was still under consideration, and since then the committee had been awaiting a communication as to the course which the Corporation proposed to take with reference to the question, but as no communication had been received, the committee recommended that the reference made to them on the 25th of February last should be discharged.

Mr. FREEMAN moved the adoption of the report, remarking that the reference to the Corporation appeared to have died a natural death, and the committee, therefore, hoped the reference would be discharged.

The report was adopted.

Mr. WALKER moved—"That, inasmuch as the ratepayers of the Metropolis are, by recent legislation, rendered very dependent upon the water companies as to the rate of charge for water, also as to the mode of supply, it is expedient, in the interest of all consumers, that the charge for the same should be based upon the principle of furnishing a necessary supply as nearly as may be possible at cost price; and, in order to carry out this principle, that it is desirable to promote a Bill in Parliament to enable this Board to purchase the interests of all the Metropolitan Water Companies on fair and equitable terms, and to make this Board the corporate body to administer the supply of water for private and public purposes in the Metropolis; and that with this view the whole question of water supply in the Metropolis be referred to the Works and General Purposes Committee to consider the subject, and to report to the Board in the month of October next as to the best mode of carrying out the proposed scheme in the public interest." In bringing forward this motion, he said ever since the Act of 1852, not only was a great injustice done to the ratepayers, but a man's birthright of a supply of pure water had been taken from him, and was now the subject of an odious monopoly. The time had now come for something to be done, as the vestries and the Board were powerless to deal with the question, and the Corporation of London had been making efforts to do so without success. The Act of 1852 operated most unjustly, by giving the companies a monopoly of water, which was an essential of life—an essential which should no less be monopolized than light or air, and which the Legislature considered was necessary to our civilization and habits. Referring to the New River Company, he contended that they had inflicted a great injustice upon very many ratepayers. The New River Company, under their Act of 1862, were entitled to charge at the rate of 4 per cent. on the assessment. To a great extent they had exceeded that rate of charge; but for some time they refrained from putting their full powers in this respect into force, although latterly they had been more alive to what they supposed were their own interests, and now great discontent was rife in all parts of the Metropolis with regard to this subject. The one great principle of the Act of 1852 was, he argued, that there should be a constant supply; but that principle had only been carried out to a very limited extent. He contended that it was of the greatest possible importance to the health of the inhabitants of London that every person should be provided with an abundant and constant supply of pure water; but, looking at the manner in which the water companies generally had conducted their operations, he considered the time had come when the Board should take the matter up in some practical manner. The City authorities had recently sent out a number of letters to various persons for information on this subject, and he was assured that they were startled by the state of things revealed by the replies that had been received. In one case, a short time ago, a gentleman who resided with his family in the City paid for water less than £2 per annum. At the present time, although his family now resided in the suburbs, he was called upon to pay £8 a year for water supplied to the same premises, although the quantity used was of necessity considerably less. This was a striking illustration of what he termed a great injustice. There were other instances where citizens were compelled to pay largely-increased rates for less water, and he submitted that on this point alone it was the duty of the Board, as representing the whole Metropolis, to take action, with a view to a clear statement being laid down as to what a fair charge for water really was. As to the mode of supply, he could not think of regarding it as satisfactory until there was universally adopted in the Metropolis the constant system. It was within his knowledge that last year a most important measure received the sanction of the Legisla-

ture with regard to this subject. It was entitled the Stockton and Middlesbrough Water Act, and was the first instance where Parliament had granted powers to a corporation for the compulsory purchase of the undertaking of a water company. At Glasgow, Manchester, and other places the corporations had acquired the water-works by agreement; but in the case of this Act, Parliament, for the first time, granted compulsory powers, and his primary object in referring to this matter was to show that if the Board decided, as he proposed, to go to Parliament for a Bill for the purchase of the London Water Companies, they had already at hand the terms on which the Legislature would sanction such purchase. His first point, however, was that the supply of such a necessity of life as water should be in the hands of the responsible public authorities, and not in the hands of private companies, whose first consideration was profit. Referring to the very high charges made by the companies for water required for public purposes, he said he thought the Board ought to have such a supply as to enable them to flush all their sewers daily during the summer months. In this matter, they were lamentably behind other large towns in the country, and it was well the Board should make good their position in regard to it. Alluding to the cost of the purchase of the undertakings of the water companies, he said it was extraordinary to notice how that cost increased the longer the purchase was delayed. In 1814 the value of one of the original King's shares in the New River Company was £7450, in 1822 it increased to £9450, in 1858 the price was £9800, but in 1870 the value had increased to £39,950. In 1873 the price was £49,000; in July, 1876, £88,050; and in November, 1876, £94,000. Those were the prices realized by public auction for one of the 64 original shares, and he asked honourable gentlemen to consider for a moment how it was that those shares were so valuable. It might be said that he had committed a great blunder in bringing this motion forward, and that he should have left it in the hands of the older members of the Board; but he had waited patiently for 18 months for one of his seniors to deal with the subject, in vain, and he now felt it his duty to move in the matter himself. He knew that it was a gigantic question, that it was a most difficult question to deal with, and that there would be a tremendous opposition to any action they might take; but let the members of the Board first of all relieve their own consciences by doing their duty, leaving the Legislature to do theirs hereafter. If they delayed, the difficulties of dealing with the question would be continually increasing, and bearing in mind that the matter was not now before either the Board or a committee in any practical shape, it was with some confidence that he submitted this proposition for their consideration. He trusted that the Board would co-operate as far as possible with the Corporation of London in this matter. He specified the month of October, because that would give ample time for the consideration of the details of the Bill. He trusted the Board would recognize the motion as one worthy of their adoption, and if it were adopted, it might be the means of conferring one of the greatest boons on the Metropolis that it was within the power of this Board to bestow.

Mr. FELL seconded the motion.

Mr. ROCHE moved, as an amendment—"That the whole question of the water supply of London be referred to the Works and General Purposes Committee, to consider and report on the advisability of introducing a Bill into Parliament authorizing the Board to purchase the interests of the several water companies." He said he hoped the Board would consider the motion submitted by Mr. Walker upon its merits, although he rather regretted the manner in which the mover had altogether ignored everything that had previously been done by the Board on this subject. Had he inquired more carefully into what had been the course of action hitherto adopted by the Board, he would have found that they had, on more than one occasion, expressed themselves strongly in favour of the very object which he sought to accomplish by his motion. Indeed, only that day the Parliamentary Committee had presented a report on a resolution of the Board to that effect. As he understood the motion, the object was that in the opinion of the Board the time had arrived when some steps should be taken to impress on the Government the necessity for the supply of water being made a municipal concern. If that really was the meaning of the motion, he thought it would be the desire of the Board to give it their cordial support. The Parliamentary Committee had been unsuccessful in their endeavours to proceed conjointly with the Corporation, so that they now reverted to their original position as to what course they should take. The honourable member for St. Luke's proposed to refer the matter to the Works Committee with certain instructions. For his own part he thought it would be wiser to refer the subject to the committee as an entirely open question, and, therefore, believing that the members generally would not like to pledge themselves, at once, to all that was stated in the motion, he proposed his amendment.

Mr. RUNTZ seconded the amendment, and referred to the various attempts made by the Board with the view of placing the water supply of the Metropolis upon a more satisfactory footing. As a reason, however, why the matter should now be taken up again, and as a proof of the importance of the question, he stated that several of the contagious diseases, notably typhoid fever and cholera, had been traced to the consumption of impure water. During the existence of the last Government, Mr. Bruce, the Home Secretary, had brought in a Bill authorizing the Board to purchase the companies, but it received so much opposition that it had to be withdrawn. He thought the time had now come when they should again appeal to the Government, on account of the pressing nature of the case, and urge upon them the necessity of doing something at once.

Mr. COOK supported the amendment, which was put and carried.

On its becoming the motion before the Board,

Mr. RICHARDSON moved another amendment to the effect—"That it is desirable to promote a Bill in Parliament to enable the Board to purchase the interests of all the Metropolitan Water Companies on fair and equitable terms, and with this view the whole question of water supply in the Metropolis be referred to the Works and General Purposes Committee to consider and report to the Board."

Mr. THOMPSON seconded the amendment.

Mr. E. D. ROGERS, in supporting the motion, said he was quite sure that those of them who had any knowledge of the subject would know that there were difficulties in the question that required mature consideration by a committee. There could be no doubt that Mr. Walker was right in calling attention to the matter. The "outside public" had the other day taken upon themselves to apply to the Home Secretary on the subject. He did not know if they were particularly called upon to do it, but of this he was sure, that before the Board attempted to discuss the matter it ought to be considered in committee.

The amendment was negatived, and Mr. Roche's motion carried.

The following are the returns of the Society of Medical Officers of Health, on the composition and quality of the metropolitan waters in January, 1877:—

Names of Water Companies.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.—As Nitrates, &c.	Ammonia. Saline.	Ammonia. Organic.	Hardness (Clarke's Scale). Before Boiling.	Hardness (Clarke's Scale). After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	18·90	0·135	0·120	0·001	0·007	13·2	3·8
West Middlesex	18·40	0·133	0·150	0·000	0·008	13·2	3·8
Southwark and Vauxhall	19·00	0·138	0·105	0·001	0·006	13·2	3·8
Chelsea	18·80	0·120	0·150	0·007	0·009	13·2	2·9
Lambeth	20·90	0·094	0·210	0·006	0·009	14·8	4·2
Other Companies.							
Kent	27·90	0·003	0·300	0·000	0·003	20·6	6·0
New River	20·50	0·094	0·216	0·000	0·006	14·9	3·3
East London	22·70	0·079	0·150	0·001	0·008	14·9	3·3

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be slightly turbid in all cases.

C. MEYMOTT TIDY, M.B.

THE GASLIGHT AND COKE COMPANY.

The following Statements of Account, for the Half Year ending Dec. 31, 1876, have been circulated with the Report of the Directors:—

No. 1.—STATEMENT OF STOCK AND SHARE CAPITAL, *on Dec.* 31, 1876.

Acts of Parliament relating to the raising of Capital.	Description of Capital.	Maximum Dividend authorized.	Number of Shares issued.	Nominal Amount of Shares.	Called up per Share.	Total paid up.	Arrears of Calls.	Remaining to be called up and unissued.	Total Amount authorized.
The Gaslight and Coke Company's Act, 1868	A Ordinary stock	10 per cent.	..	..	..	£1,344,310	..	..	1,550,000
	A Preference convertible stock, 1st issue	5 ,,	..	..	..	2,750	..	..	
	Ditto, 2nd issue	Ditto.	..	..	..	2,940	..	..	
	A Preference convertible shares, 3rd issue	Ditto.	20,000	£10	£10	200,000	..	..	
The Gaslight and Coke Company's Act, 1872	Ditto, 4th issue	Ditto.	50,000	10	6	299,986	14	£200,000	1,000,000
	Ditto, 5th issue	Ditto.	50,000	10	2	100,000	..	400,000	
The Victoria Docks Gas Act, 1857	Ditto, 3rd issue	Ditto.	10,000	10	10	100,000	..	..	100,000
The City of London Gas Company's Act, 1859	A Ordinary stock	10 per cent.	..	..	..	300,000	..	..	400,000
	B Stock	4 ,,	..	..	..	100,000	..	..	
The Companies Act, 1862, as applied to the Western Gaslight Company, Limited	A Ordinary stock	10 ,,	..	..	..	600,000	..	..	600,000
The Imperial Gas Act, 1854	Ditto	Ditto.	..	..	..	1,560,000	..	..	1,560,000
The Great Central Gas Consumers Act, 1851	C Preference stock	Ditto.	..	..	..	200,000	..	..	200,000
The Equitable Gaslight Company's Act, 1842	D ,, ,,	Ditto.	..	..	..	300,000	..	..	300,000
The Independent Gaslight and Coke Company's Act, 1864	E ,, ,,	Ditto.	..	..	..	165,000	..	..	255,000
	F ,, ,,	5 per cent.	..	..	..	30,000	..	..	
	G ,, ,,	7½ ,,	..	..	..	60,000	..	..	
The Imperial Gas Act, 1866	H Stock	7 ,,	..	..	..	325,000	..	..	325,000
The Imperial Gas Act, 1869	Ditto	Ditto.	..	..	..	975,000	..	..	975,000
The Gaslight and Coke Company's Act, 1876	..	10 per cent.	..	..	..	..	..	1,000,000	1,000,000
						£6,664,986	14	£1,600,000	£8,265,000

No. 2.—STATEMENT OF LOAN CAPITAL, *on Dec.* 31, 1876.

Acts of Parliament authorizing the Loan Capital.	Total Amount authorized.	Description of Loan.	Rates per Cent. of Interest. 4 per Cent.	4½ per Cent.	4¾ per Cent.	4½ per Cent.	5 per Cent.	10 per Cent.	Total Amount borrowed.	Remaining to be borrowed.
The Gaslight and Coke Company's Act, 1868	£462,500	Debentures.	£9,300	£20,000	£166,450	£651,345	£6,000	..	£1,436,500	£125,000
The City of London Gas Company's Act, 1859	60,000									
The Great Central Gas Consumers Act, 1851	66,000									
The Victoria Docks Gas Act, 1857	25,000	Deben. stk.	138,035	..	50,000	265,350	..	..		
The Companies Act, 1862, as applied to the Western Gaslight Company, Limited	200,000	Bnds. for capitalised profits	..	..	..	..	..	£130,000		
The Imperial Gas Act, 1854	173,000									
The Imperial Gas Act, 1866	81,250									
The Imperial Gas Act, 1869	243,750									
The Gaslight and Coke Company's Act, 1872	250,000									
The Gaslight and Coke Company's Act, 1876	1,000,000	..	..	..	..	..	..	..	..	1,000,000
	£2,561,500		£147,335	£20,000	£216,450	£916,695	£6,000	£130,000	£1,436,500	£1,125,000

Dr. **No. 3.—CAPITAL ACCOUNT.** *Cr.*

	Expended this Half Year.	Total Expenditure to Dec. 31, 1876.		Receipts to June 30, 1876.	Received since that date.	Total Receipts to Dec. 31, 1876.
	£ s. d.	£ s. d.		£ s. d.	£ s. d.	£ s. d.
To Expenditure to June 30, 1876	..	7,422,240 19 7	By A Ordinary stock	3,797,770 0 0	..	3,804,310 0 0
Expenditure during half year to Dec. 31, 1876—viz.:			A 5 per cent. preference convertible stock	*6,370 0 0	..	2,750 0 0
Lands acquired, including law charges	727 4 3		A 5 per cent. preference convertible stock, 2nd issue	*5,860 0 0	..	2,940 0 0
Buildings and machinery in extension of works	143,416 9 9		A 5 per cent. preference shares, 3rd issue	300,000 0 0	..	300,000 0 0
New and additional mains and service-pipes	18,797 19 10		A 5 per cent. preference shares, 4th issue	200,000 0 0	99,986 0 0	299,986 0 0
New and additional meters	1,903 8 3		A 5 per cent. preference shares, 5th issue	100,000 0 0	..	100,000 0 0
Parliamentary costs	3,201 11 1		B 4 per cent. maximum stock	100,000 0 0	..	100,000 0 0
	168,046 13 2		C 10 per cent. preference stock	200,000 0 0	..	200,000 0 0
Cr.			D 10 „ „ „	300,000 0 0	..	300,000 0 0
By Sale of disused plant £2,529 18 2			E 10 „ „ „	165,000 0 0	..	165,000 0 0
„ surplus land 4,471 11 3			F 5 „ „ „	30,000 0 0	..	30,000 0 0
	7,001 9 5		G 7½ „ „ „	60,000 0 0	..	60,000 0 0
		161,045 3 9	H 7 per cent. maximum stock	1,300,000 0 0	..	1,300,000 0 0
			Debentures	+896,150 0 0	..	853,095 0 0
			Debenture stock, 4½ per cent.	265,350 0 0	..	265,350 0 0
			„ „ 4½ „	20,000 0 0	..	50,000 0 0
			„ „ 4 „	..	125,000 0 0	138,055 0 0
			Bonds for capitalized profits	130,000 0 0	..	130,000 0 0
		7,583,286 3 4		7,876,500 0 0	224,986 0 0	
To Balance of capital account		518,199 16 8				
		8,101,486 0 0				8,101,486 0 0

* £6540 of these issues have been converted into ordinary stock during the half year.

† Debentures, amounting to £43,055, have been exchanged for debenture stock during the half year.

Dr. **No. 4.—REVENUE ACCOUNT.** *Cr.*

	£ s. d.	£ s. d.		£ s. d.	£ s. d.
To Manufacture of gas—			By Sale of gas—		
Coals, including dues, carriage, unloading, and trimming (*see* Account No. 10)	419,119 1 2		Common gas, per meter, at 3s. 9d. per 1000 cubic feet	682,979 18 5	
Salaries of engineers and other officers at works	6,814 13 9		Common gas, per meter, at 3s. 6d. per 1000 cubic feet	92,195 17 9	
Wages (carbonizing)	72,483 17 8		Cannel gas, per meter, at 4s. 8d. per 1000 cubic feet	45,243 9 0	
Purification, including £10,497 15s. 11d. for labour	22,892 16 11		Cannel gas, per meter, at 4s. 4d. per 1000 cubic feet	3,077 15 0	
Repair and maintenance of works and plant, materials, and labour; less received for old materials, £3078 17s. 10d.	107,283 5 2		Cannel gas, sold in bulk, at 3s. 9d. per 1000 cubic feet	5,913 9 4	
		628,593 14 8	Public lighting and under contracts—		
Distribution of gas—			Common gas	63,427 4 7	
Salaries and wages of officers (including rental clerks)	15,714 14 8		Cannel gas	5,752 12 9	
Repair, maintenance, and renewal of mains and service-pipes	23,049 7 5		(*see* Statement No. 12)		898,590 6 10
Repairs and renewals of meters	16,661 16 2		Rental of meters	..	16,428 7 2
		55,425 18 3	Residual products—		
Public lamps—			Coke, less £16,810 5s. 11d. for labour, &c.	151,732 2 7	
Lighting and repairing	..	12,527 5 11	Breeze, less £1438 4s. 5d. for ditto	784 14 10	
			Tar, less £337 4s. 7d. for ditto	68,347 1 10	
Rents, rates, and taxes—			Ammoniacal liquor, less £302 16s. 6d. for ditto	42,280 9 3	
Rents payable	5,007 2 11				263,144 8 6
Rates and taxes	24,972 9 4		Rents receivable	..	2,336 8 5
		29,979 12 3	Transfer fees	..	161 19 4
Management—			Canteen account	..	323 18 9
Directors allowance	3,750 0 0				
Company's auditors	410 0 0				
Salaries of secretary, accountant, and clerks	6,102 13 9				
Collectors commission	10,278 6 5				
Stationery and printing	4,052 17 1				
General charges	1,950 9 1				
		26,544 6 4			
Law charges	..	1,079 18 6			
Parliamentary charges	..	926 8 5			
Bad debts	..	3,942 2 7			
Depreciation-fund, for works on leasehold lands	..	750 0 0			
Superannuation allowances under amalgamation schemes, and annuities	..	10,368 19 10			
Public officers—					
Gas referees and official auditor	1,272 15 11				
Public testing-stations	76 14 10				
		1,349 10 9			
		771,487 17 6			
Balance carried to net revenue account (No. 5)		409,497 11 6			
		1,180,985 9 0			1,180,985 9 0

Dr. **No. 5.—NET REVENUE ACCOUNT.** *Cr.*

	£ s. d.		£ s. d.
To Interest on debentures, debenture stocks, and bonds, accrued to Dec. 31, 1876	33,198 11 6	By Balance from last account £324,003 8 11	
Dividend on A 5 per cent. preference shares and stock £16,392 1 6		Less dividend on ordinary capital for the half year to June 30, 1876 189,888 10 0	
„ B stock, at 4 per cent. 2,000 0 0			134,114 18 11
„ C „ 10 „ 10,000 0 0		Revenue account (No. 4)	409,497 11 6
„ D „ 10 „ 15,000 0 0		Dividend from the estate of Benjamin Higgs	102 16 8
„ E „ 10 „ 8,250 0 0			
„ F „ 5 „ 750 0 0			
„ G „ 7½ „ 2,250 0 0			
„ H „ 7 „ 45,500 0 0			
	100,142 1 6		
Interest on temporary loans	207 8 5		
Commutation of annuities payable under amalgamation schemes	176,525 9 4		
Balance applicable to dividend on the ordinary stock	233,641 16 4		
	£543,715 7 1		£543,715 7 1

Dr. **No. 6.—RESERVE-FUND ACCOUNT.** *Cr.*

	£ s. d.		£ s. d.
To Balance on Dec. 31, 1876	50,161 1 4	By Balance on June 30, 1876	48,598 14 5
		Interest on amount invested	1,562 6 11
	£50,161 1 4		£50,161 1 4

Dr. **No. 7.—CONTINGENCY-FUND ACCOUNT.** *Cr.*

	£ s. d.		£ s. d.
To Balance on Dec. 31, 1876	50,000 0 0	By Balance on June 30, 1876	50,000 0 0

Dr. **No. 8.—INSURANCE-FUND ACCOUNT.** *Cr.*

	£ s. d.		£ s. d.
By Balance on Dec. 31, 1876	69,747 13 5	By Balance on June 30, 1876	68,659 18 11
		Interest on amount invested	1,087 14 6
	£69,747 13 5		£69,747 13 5

No. 9.—DEPRECIATION-FUND ACCOUNT (for Works on Leasehold Lands).

Dr.	£ s. d.		*Cr.* £ s. d.
To Balance on Dec. 31, 1876	7,953 8 8	By Balance on June 30, 1876	7,103 19 2
		Amount brought from revenue account for the half year	750 0 0
		Interest on amount invested	99 9 6
	£7,953 8 8		£7,953 8 8

No. 10.—STATEMENT OF COALS USED, &c.

Description of Coal.	In Store, June 30, 1876.	Received during Half Year.	Carbonized during Half Year.	Used during Half Year.	In Store, Dec. 31, 1876.
	Tons.	Tons.	Tons.	Tons.	Tons.
Common	71,030	524,296	475,032	165	120,129
Cannel	11,772	33,857	29,067	..	16,562

No. 11.—STATEMENT OF RESIDUAL PRODUCTS.

	In Store, June 30, 1876.	Made during Half Year.	Used in Manufacture during Half Year.	Sold during Half Year.	In Store, Dec. 31, 1876.
Coke—chaldrons	7,778	482,452	140,645	318,043	31,542
Breeze—ditto	1,501	45,978	..	43,974	3,505
Tar—gallons	580,516	5,125,764	..	4,481,488	1,224,792
Ammoniacal liquor—butts of 108 gallons	4,751	135,585	..	128,662	11,674

No. 12.—STATEMENT OF GAS MADE, SOLD, &c.

Description of Gas.	Quantity Made (part measured).	Quantity Sold. Public Lights and under Contracts (estimated).	Quantity Sold. Private Lights (per Meter).	Quantity Sold. Total Quantity Sold.	Quantity used on Works, &c.	Total Quantity accounted for.	Quantity not accounted for.	Number of Public Lamps.
	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	
Common	4,823,807	286,763	4,169,393	4,456,156	60,562	4,516,718	307,089	30,951
Cannel	287,519	19,609	*239,644	259,253	1,026	260,279	27,240	3,371

* This includes the quantity sold in bulk.

GENERAL BALANCE-SHEET, on *Dec.* 31, 1876.

Dr.	£ s. d.		£ s. d.	*Cr.* £ s. d.
To Capital—		By Cash at bankers	..	42,333 10 7
Balance at credit thereof (Account No. 3)	518,199 16 8	Amount invested—		
Net revenue—		Reserve-fund	100,161 1 4	
Balance at credit thereof (Account No. 5)	233,641 16 4	Contingency-fund		
Reserve-fund account—		Insurance-fund	69,747 13 5	
Balance at credit thereof (Account No. 6)	50,161 1 4	Depreciation-fund	7,953 8 8	
Contingency-fund account—				177,862 3 5
Balance at credit thereof (Account No. 7)	50,000 0 0	Stores on hand, viz.—		
Insurance-fund account—		Coals	123,223 7 7	
Balance at credit thereof (Account No. 8)	69,747 13 5	Coke	13,355 9 6	
Depreciation-fund account—		Tar and ammoniacal liquor	20,174 18 9	
Balance at credit thereof (Account No. 9)	7,953 8 8	Sundry stores	81,960 2 1	
Debenture interest for amount due to Dec. 31, 1876	24,790 4 11			238,713 17 11
Bond interest for amount due to Dec. 31, 1876	6,500 0 0	Accounts due to the company, viz.—		
Preference dividends for amount due to Dec. 31, 1876	100,142 1 6	Gas and meter rental—		
Unclaimed dividends	5,771 15 1	Quarter ending Dec. 31, 1876	628,560 5 11	
Sundry tradesmen and others, for amount due for coals, stores, and sundries	146,358 11 2	Arrears outstanding	10,537 15 2	
Benevolent-fund	1,526 16 0		639,098 1 1	
		Coke and other residual products	63,694 8 4	
		Sundry accounts	15,035 3 9	
				717,827 13 2
		Retiring allowances	..	38,056 0 0
	1,214,793 5 1			1,214,793 5 1

YORK UNITED GAS COMPANY.

The Half-Yearly Meeting of Shareholders was held on the 1st inst.—Alderman Weatherly in the chair.

The Secretary (Mr. C. Sellers) read the following report of the directors:—

Your directors have to report that during the past half year the business of the company in all departments has been unusually active. The remodelling of a large portion of the retorts, commenced last spring, was satisfactorily completed in autumn. This important work has necessarily added to the expenses of the past half year, but the benefits of such special charges in lessening future repairs will be felt in years to come.

In the gas department, on account of the prevaling darkness of the weather, the increase in consumption has been above the average. But, on the other hand, the unusual mildness of the winter, coupled with continued depression in trade, has so checked the demand for coke that your directors in December last resolved to lower the price to 10s. per ton, a reduction which six months since they did not contemplate.

With the view, however, of bringing the worth of coke for domestic fuel more prominently before the public, your directors have deemed it wise that the company should have its own horse and lurry, so as to be enabled to give prompt attention to all orders sent to the company's office. This arrangement has given great satisfaction.

In their last report your directors thought it possible they might have been in a position at this meeting to have announced another reduction in the price of gas, but considering the reductions within the last six months in the price of coke, and the great difference in revenue which the present exceptionally low price will make, if it continues, upon the current half year, they feel sure that a reduction in gas will not at present be expected.

Your directors have further to report that, since the last meeting of the shareholders, two vacancies have occurred at their board. The first took place last August, through the death of their esteemed colleague, Mr. David Hill, whose seat at the board has been supplied, pursuant to the company's Act, by appointing Mr. Sheriff Bulmer, an appointment which the directors believe will be received with satisfaction by the shareholders. The other vacancy has occurred more recently, through the death of their esteemed co-director, Mr. Alderman Steward.

The last issue of new shares of the company being now paid up, and entitled to the same dividend as the old shares, your directors recommend that the usual dividend of 5s. per share be declared upon all the shares of the company, and paid on and after the 6th inst., free from income-tax.

The Chairman, in moving the adoption of the report, said he thought, after taking into consideration the details of their business during the half year, the shareholders would agree with him the report was a satisfactory one. The directors could have wished, as the report implied, that it had been more satisfactory; that was to say, they would have been glad if their finances had enabled them to have made a reduction in the price of gas; but, like other people, they must bow to circumstances. The sale of coke, as they all knew, was one of their main sources of income. Had the price of coke been maintained at the sum it fetched six months ago, the directors could that morning have announced a reduction in the price of gas. Bearing upon that question, a friend of his, who was a consumer of both gas and coke, remarked that he was not sorry they had had to reduce the price of coke, because the price of gas was sufficiently low, and it was time that the coke consumers had a turn. He (the chairman) thought there was some truth in that, for the price of gas in York was very reasonable, and, in fact, there were very few towns in the kingdom where it was sold at so cheap a rate; and, in reference to coke, he thought it might be fairly stated that the consumers of that article were now, as his friend said, "getting a turn," for the company had never sold it at a lower rate. The report told them that they had been unusually busy during the past half year. Although the weather had been exceedingly mild it had also been exceedingly dull and damp, and in consequence they had manufactured more gas during this winter than they had done before. As their business increased they would be constantly called upon to meet it, and it was not only necessary that they should provide for their actual business, but it was also necessary to anticipate business with proper foresight, as on that, the success of a business like theirs greatly depended. Since the last half-yearly meeting two of their old and valued friends had passed away—Mr. David Hill and Alderman Steward. He need scarcely say that whilst his brother directors and himself all most deeply deplored their loss, they at the same time could not say too much of their personal worth, and their great business abilities; and in that feeling and expression of sympathy he was sure the shareholders would fully concur.

Mr. J. F. Taylor seconded the adoption of the report.

Mr. W. W. Hargrove said he thought the report would prove satisfactory, not only to themselves, but also to the general body of shareholders. All who were connected with large establishments must know by experience the importance and necessity, and he might say the economy, of not only keeping up all their appliances in a complete state of efficiency, but of availing themselves from time to time of the improvements of the age. The remodelling of the retorts, therefore, and their adaptation to present requirements, must be viewed as an act of wise policy on the part of the directors, notwithstanding that the expenditure for the half year had been augmented thereby. He thought that none of them had any reason to complain of the price of gas, or that the conditional promise of its further reduction had been deferred. He had had the curiosity to look over some statistics with regard to the price of gas in other towns, compared with which York occupied a very favourable position. In Scarborough and Dewsbury the price charged was 4s. 6d. per 1000 cubic feet; in Liverpool it was 4s.; Worcester, 3s. 6d.; Halifax, Huddersfield, Leeds, Bradford, and Manchester, 3s. 4d.; Birmingham, 3s. 3d.; Nottingham, 3s. 2d.; York, Sheffield, Darlington, and Newcastle, 3s. So that out of fifteen of the largest and most important towns the rate in eleven was higher than in York, and in none less. He was also struck the other day, in glancing at the report of a meeting at Middlesbrough, where Mr. Dunning, who was an influential member of the Town Council, in defending the illuminating power of their own gas, stated that a friend of his, who had been a great traveller through England, had informed him that the three best illuminated towns in England were Plymouth, Middlesbrough, and York. With testimony such as this, whether in reference to price or illuminating power, he (Mr. Hargrove) thought they had no reason to be dissatisfied. They ought also to remember the peculiar and difficult position in which the directors were placed. Not only had they to provide a satisfactory

dividend for the shareholders, but they had also to manufacture gas of such an excellent quality, and at such a reasonable price, as would satisfy the general consumers. It appeared to him that in the present instance the directors had met all those requirements, and therefore they could not do less than unanimously adopt the report.

Mr. PHILLIPS asked if the gas-pipes had been examined to ascertain whether they were sufficiently strong to bear any increased pressure. Although he asked the question, he expected the reply would be favourable.

The CHAIRMAN asked Mr. Phillips if he had any reason to believe that any of the pipes had been broken. He had not heard of any, and that spoke volumes that the pipes were sufficiently strong to bear all the pressure required.

Mr. PHILLIPS expressed his entire approval of the report of the directors, knowing that they would declare a dividend that would be honestly earned, that the works in all departments were in a satisfactory state, and that the accounts would bear investigation. He had every confidence in the directors, and considered that they were the persons who should have the management of the works. A few years ago a great declamation was made against independent companies having the charge of gas-works, and for those works being managed by corporations, who, it was argued, would more efficiently manage them for the benefit of the ratepayers. The Corporation of Leeds had for some years had the management of the gas-works there, and there was now a great stir made because they could not put any pressure on the pipes, lest there should be an explosion and a blow up. There had also been complaints about the leakage of the pipes at Leeds, and it was stated to amount to 12,000 feet of gas per mile, which he considered was very considerable. A special meeting of that corporation had been called—and what for, did they think? To consider the necessity of increasing the illuminating power of their gas. The fact was that, although they had gas at Leeds, they were always in darkness.

Mr. R. H. FELTOE, in alluding to complaints respecting the illuminating power of the gas, speaking from personal experience, stated that where such complaints arose, the insufficient light was caused through the services from the mains to the houses not being large enough to supply the number of lights used. He endorsed the remarks of the previous speaker relative to the excellent illuminating power of their gas.

The motion was then put and carried, and the dividend recommended in the report was declared.

Mr. J. R. HILL moved a vote of thanks to the Chairman and Board of Directors for their efficient management of the affairs of the company. When they considered, on the one hand, the very largely increased expenditure, and, on the other hand, the small receipts from the sale of coke, they must say that the state of affairs showed that there had been in the management of the company great care and wisdom exercised. He congratulated the directors and shareholders upon the addition to the board caused by the recent appointment of the City Sheriff.

Mr. H. PRESTON having seconded, the vote of thanks was unanimously passed.

The CHAIRMAN returned thanks, and the meeting then terminated.

YORK NEW WATER-WORKS COMPANY.

The Half-Yearly Meeting of Shareholders was held on the 1st inst.—Mr. J. F. TAYLOR in the chair.

The directors report (read by Mr. J. P. WOOD) was as follows:—

The shareholders will be gratified to observe that the revenue of the company continues steadily to advance, and the directors feel that the time has arrived when they are justified in recommending an increase in the dividend.

The directors have the satisfaction to report that they have extended the mains of the company through the village of Acomb, and also made further extensions in the village of Fulford; and, in addition to the great advantage which the supply of water will be to the inhabitants, they have confidence that the step they have taken will prove remunerative to the company.

The works in connexion with the duplicate trunk main from the reservoir at Severus Hill to the city are now in progress, and the directors are making the necessary arrangements with the view of erecting the proposed additional pumping-station.

The shareholders will no doubt have observed that notice was given of an intended application to Parliament for an Act to supply the city of York with water from near Lastingham, in the North Riding of this county. The directors, knowing that this company fully meets the requirements of York and its neighbourhood by furnishing an ample supply of wholesome water, and that the success of such an application would be most detrimental to the interests of the company, were taking the necessary proceedings to vigorously oppose the same; when, in consequence of the scheme not receiving any support from the citizens, the Bill was abandoned.

The directors recommend that a dividend of 8s. per share on the ordinary shares for the past half year, being at the rate of £8 per cent. per annum, be declared, and that a dividend of 6d. per share on the preference shares from the 1st of October to the 31st of December last, being at the rate of £5 per cent. per annum, be also declared, and that the same respectively be paid as tax on and without deduction for income, after Feb. 6, 1877.

The directors regret to have to report that Mr. Thomas Ellis, in consequence of impaired health, has resigned his appointment as a director of the company. They have elected in his place Mr. John Wilson, of this city, builder, and late an auditor of the company. The directors also regret that Mr. Thomas Turner, in consequence of the state of his health, has resigned his seat at the board. They have elected Mr. Joseph Terry, of this city, alderman, a director in his place.

The following directors—viz., Mr. William Sotheran, Mr. Ralph Davison, and Mr. Alderman Terry, retire by rotation, and are eligible for re-election. In consequence of the vacancy in the office of one of the auditors by the resignation of Mr. John Wilson, another auditor will have to be elected, and the directors beg to suggest Mr. John Brown, of High Ousegate, York, druggist, as a suitable person to fill that office.

The CHAIRMAN, in moving the adoption of the report, said that the directors had entered into a new phase of labour in consequence of the powers obtained by the new Act of Parliament which they obtained last session. The amount of responsibility, anxiety, and labour which was entailed upon them by that Act was different to the ordinary course of their action before that Act was obtained. As the new Act gave them power to raise new capital, to employ that capital, and to carry out new works, they must feel that a considerable addition was made to their work. The directors, however, felt that they had not obtained the Act a day too soon. He might say that had they obtained it a year or two ago, perhaps they might have been better able to compete with the requirements of the city than they were now. Having obtained the Act, they were now, to the best of their ability, putting its powers into operation. Referring to the new auxiliary main from the reservoir to the city, he said they had got a right market for the pipes, and the contract they had made was a very satisfactory one. The main was now being laid, and when it was completed it would give them greater power to meet the requirements of the city. The company had extended their mains to Acomb and Fulford, and they had reason to believe that they would have to make other extensions to suburban districts, but these it was believed would be as remunerative as the extensions already made. It was some satisfaction to the citizens to know that they were not living in a city that was decaying, but in a city the trade of which was flourishing and prosperous. They had a right to congratulate themselves that York was a prosperous and increasing city, for as it increased in size, and in the number of its inhabitants, additional water would be required. They might also congratulate themselves as shareholders that the company were increasing and extending every half year. Speaking of the Ebor Water Bill, he said that it was evident, from the way it was received, that it was not a scheme which would commend itself to the attention of the citizens, and as it had failed perhaps they had better let it fade from memory. It had had, however, one good effect upon the directors. It had led them to examine their position more closely than they had hitherto done, and ascertain the quality of the water they supplied to the inhabitants of York, and he said with all confidence that the analyses they obtained from several analysts—they did not confine themselves to one or two—proved that the water they supplied was good and wholesome. The directors recommended that the dividend be increased from 7 to 8 per cent. He might remind them that in 1869 the half-yearly dividend paid by the company was £1800, while in 1874 it was raised to £2800, not so much by an increase in the per centage of the dividend, but by the creation of new capital, and by having the mortgage debt converted into capital and partaking of the dividend at the same rate as the original capital of the company. From 1874 to the present time there had been no increase, but he did not think the shareholders would be surprised that they were in a position to pay more than they were able to pay three years ago. Looking at the accounts, they considered they were only doing an act of justice to the shareholders in paying to them what the company had justly and honestly earned. The directors therefore confidently recommended that the dividend be increased to 8 per cent. Had they had the slightest fear or suspicion that they should have to go back to a dividend of 7 per cent. they would not have come before the shareholders with that recommendation; but they, however, believed that the dividend of 8 per cent. could be maintained under ordinary circumstances, and unless anything happened beyond the ken of the board. Since the report was printed the directors had considered one or two important matters. The first of these was that they had purchased from Mr. Barstow the land which was scheduled in the Act of Parliament, and which adjoined their works, for the purpose of erecting upon it a new engine-house, and for providing space for constructing filtering-beds, subsiding-tanks, and whatever might be required in future by the company. Mr. Barstow was an unwilling seller, and they were buyers under an Act of Parliament, but that gentleman had met them in a very fair and honourable spirit, although he did tell them he would attend that meeting to inform the shareholders that they (the directors) had dealt hardly with him, and had driven a hard bargain. Mr. Barstow, however, was not present; but the directors were satisfied, taking all the circumstances into account, that the land had been obtained on terms satisfactory to the shareholders. Mr. Hawksley, their engineer, had issued the advertisement for the erection of the new works, and they hoped they would be in a position immediately to proceed with the erection of those works. Bye-laws had been sanctioned, and the plumbers of the city had signified their intention to work according to the regulations contained in them.

Mr. J. L. FOSTER seconded the motion.

Mr. W. C. ANDERSON alluded to the correspondence which had appeared in the newspapers alleging that the water supplied to the city was impure, remarking that it was a great pity that it had appeared, as the water supplied to York was superior to that supplied to the majority of towns. The persons who had brought forward the subject must have done it inconsiderately, for in many respects it had been detrimental to the town. It had come to his own knowledge that persons who had intended coming to York to reside had, after seeing those letters, kept away, and no doubt other persons would know of similar instances; therefore a serious injury had been done to the city. As regarded Lastingham and Kirbymoorside, it was true that there was beautiful water in many springs; but it happened about two years ago that three specimens of water were sent to him from that neighbourhood by a person who wished to build a handsome dwelling there, and who wanted to know if the water was good. Two of those waters were proved, after careful analysis by a very experienced analyst, to be not fit for drinking purposes. There were many such instances on the high moors, where the water was so filled with mineral and other contamination as to be unfit for ordinary use. Referring to the dividend, he remarked that, considering the proposed large increase of their works, he would have preferred that the augmentation of the dividend had been deferred for some time, but he did not think the directors would have proposed it unless they believed they could continue it.

Mr. R. H. FELTOE said that in the last Act of Parliament the York Corporation had power to take samples of their water for analysis. He asked if any samples had been taken, and what was the result. He also expressed his satisfaction at the creation of a capital account, and in reference to the Water Bill already mentioned, he remarked that he never expected it would succeed, but still it must have caused an anxious time for the directors, who had strained every nerve to protect the interests of the company.

Mr. WOOD having read the section of the Act of Parliament referring to the powers of the York Corporation to extract and analyze the company's water,

The CHAIRMAN said that during the half year the corporation had taken samples of water, and the report of the analyses which had been forwarded to the company was to the effect that it was wholesome and pleasant drinking water.

The dividend as mentioned in the report was formerly declared, and Messrs. Sotheran, Davison, and Terry were re-elected directors, and Mr. J. Brown was elected auditor.

A vote of thanks to the chairman and directors terminated the meeting

CAMBRIDGE UNIVERSITY AND TOWN GAS COMPANY.

The Half-Yearly Meeting of the Shareholders of this Company was held at the Offices in Sidney Street, on Thursday, Jan. 25—Dr. PHELPS, the chairman, presiding.

The CHAIRMAN said that, before proceeding with the ordinary business of the day, he must ask for an expression of sympathy and regret for the loss they had sustained by the death of their friend, Mr. Charles Edward Brown. Although for some time past he had been unable to take any active part in the affairs of the company, yet he was a thorough man of business, and they would feel his loss very much. He had now to propose the adoption of the reports, which had been printed and circulated, and that they be entered on the minutes. He had not much to say about them except to congratulate the shareholders on the very excellent and sound condition of the concern. He had no necessity to refer to them, except to the report of the manager, from which they would learn that the consumption had increased to such an extent that it was necessary there should be an extension of the works. All would be glad to hear that the requisite funds should be contributed for that purpose. He had no doubt the company would go on and flourish. He moved the adoption of the following reports:—

Directors Report.

The directors herewith submit to the shareholders a statement of accounts for the half year ending Christmas, 1876, which accounts have been duly audited.

The directors recommend a dividend for the half year after the rate of 10 per cent. per annum on the consolidated stock, and after the rate of 7 per cent. per annum on the amount paid up on the new shares, payable on the 1st of February next, free of income-tax.

In view of extensive renewals and additions necessary to be made, a further call of £2 per share will shortly be made on the new shares.

The directors have to express their sincere regret that a vacancy has occurred in their number by the death of their much lamented colleague, Mr. Charles Edward Brown, who

for many years was a valued member of the board. They have elected in his place Mr. John Death. By this election the office of auditor of the company's accounts becomes vacant, and it will the duty of the shareholders at the half-yearly meeting to elect another auditor.

Manager's Report.

The increased demand for gas has taxed the capacity of your present producing power to its utmost limits, and although the supply has been fully maintained, it would not be prudent to allow the next winter to approach without making provision for expected further increase of consumption.

More retorts and a larger station-meter must be provided.

The additional steam-boiler ordered by you has been fixed, and is now in use. This places your exhausting apparatus in perfect condition.

The old main on the Lensfield Road has been taken up, and a 10-inch main laid, which, with the 6-inch main on Trumpington Road, has fully met the requirements of the Brookland district.

The illuminating power of the gas has, with very slight exceptions, been kept up to the required standard. The pressure and purity have been at all times fully maintained.

The following is the balance-sheet for the half year ending Christmas, 1876:—

Dr.	*Capital Account.*			*Cr.*		
Stock	£37,440	0	0	Expenditure on capital account	£59,391	15 10
New shares	13,104	0	0	Extensions to Christmas, 1876	779	8 10
Loans	9,300	0	0			
Balance	327	4	8			
	£60,171	4	8		£60,171	4 8

Profit and Loss for the Half Year ending Christmas, 1876.

Manufacture	£7,635	15	11	Sale of gas and meter-rents	£10,693	4 9
Distribution	938	1	3	Sale of fittings	943	2 2
Fittings	507	5	3	Sale of coke	1,902	1 3
Miscellaneous	1,803	6	11	Sale of tar	917	2 3
Balance	2,971	1	1			
	£13,855	10	5		£13,855	10 5

General Balance.

Revenue account	£2,971	1	1	Owing to the company for gas, &c.	£13,115	15 9
Banker's balance	2,713	3	0	Stock	3,021	17 8
Floating assets	10,766	12	9	Capital account	327	4 8
Unpaid dividends	3	11	9			
Balance of wages account	10	9	6			
	£16,464	18	1		£16,464	18 1

Mr. S. PEED seconded the proposition, which was unanimously carried.

Dr. PHELPS moved the dividends as recommended in the report.

Dr. DROSIER seconded this, and it was carried.

Mr. REDFARN proposed Mr. Clayton as auditor, in the place of Mr. Death, and trusted it would only be a stepping-stone to further advancement in the company.

Mr. S. PEED seconded the resolution, which was carried.

Mr. CLAYTON returned thanks.

Dr. DROSIER proposed, Mr. DIMMOCK seconded, and Dr. FAWCETT supported a vote of thanks to the chairman, which was unanimously carried.

Dr. PHELPS briefly responded, and the proceedings terminated.

CAMBRIDGE WATER-WORKS COMPANY.

The Half-Yearly Meeting of this Company was held on Friday, Jan. 26—ELLIOT SMITH, Esq., in the absence of the Provost of King's College, presided.

The following are the reports, which, with the balance-sheet, had been printed and circulated, and were taken as read:—

Directors Report.

Your directors herewith transmit the statement of accounts for the past half year. They recommend that a dividend on the consolidated stock, and on the first, second, and final calls upon the new £2 shares, for the half year ending Jan. 6, 1877, at the rate of £10 per cent. per annum, be paid on the 1st of March next, free of income-tax. To assist in the payment of this dividend, the sum of £38 9s. 10d. will be appropriated from the suspense account.

All the calls on these shares being paid, it is proposed to convert them into stock.

The directors refer the shareholders to the engineer and manager's report, which shows the progress of the company's business and the extension of the works.

A call of 10s. per share will be made on the new shares created at the meeting held in May last, payable on the 6th of April next.

The directors regret the loss of their late auditor, Mr. C. E. Brown, whose successor remains to be elected by you at the ensuing meeting.

In consequence of this vacancy, they have of unavoidable necessity to submit to you the accounts unconfirmed by the usual audit.

The retiring directors are the Rev. Dr. Okes and the Rev. Dr. Pulling, who are eligible for re-election.

Manager's Report.

During the past half year, water from the company's works has been laid on to 104 premises, the increased rental derivable from which is £113 per annum. The total number of premises now supplied is 6738.

The new works in progress at the company's pumping-station are well advanced, and the additions to the distributing mains in the town are nearly complete.

The general condition of the company's works is satisfactory.

Dr.	*General Balance, Jan. 6, 1877.*			*Cr.*		
Revenue account	£2,399	0	1	Banker's balance	£1,524	15 4
Capital account	333	17	3	Manager's balance	57	8 9
Unpaid dividend	35	8	3	Water-rates	1,622	6 8
Suspense account and sale of unallotted shares	876	6	1	Water account (sundries)	308	15 7
Accounts owing by the company	1,387	1	0	Fitting accounts	645	19 11
				Stock in hand	324	2 9
				Rents (ordinary)	31	15 0
				Transfer fees	2	15 0
				Rents (Cherryhinton estate)	79	17 8
				Improvement commissioners interest	20	12 0
				Ditto (stand-post account)	413	4 0
	£5,031	12	8		£5,031	12 8

The CHAIRMAN, after expressing his regret that the Provost of Kings College, though happily better, was not able to be present, and also expressing the regret they must all feel at the loss of Mr. C. E. Brown, one of their auditors, congratulated the shareholders upon the condition of their affairs, and proposed that the report be received and adopted.

This was unanimously agreed to, as also was a further resolution from the chair, as to the declaration of the dividend recommended by the report.

It was resolved to convert the new shares into capital stock.

Dr. Okes and Dr. Pulling were then re-elected directors.

Mr. W. CLAYTON proposed, and Mr. COLLYER seconded, the election of Alderman Deck as auditor, in the place of the late Mr. C. E. Brown.

Mr. EADEN proposed, and Mr. S. PEED seconded, the election of Mr. Nutter.

On a division being taken, there were found to be 275 votes for Mr. Deck, and 221 for Mr. Nutter.

The CHAIRMAN declared Mr. Deck elected.

The usual votes of thanks to the chairman and to the directors terminated the proceedings.

WORCESTER GAS COMPANY.—The ordinary half-yearly meeting of shareholders was held at the company's offices on Tuesday last. The usual formal business was transacted, namely, receiving the report of the directors and declaring a dividend of 5 per cent. for the half year.

NORWICH WATER-WORKS COMPANY.

The Half-Yearly Meeting of Shareholders was held on Wednesday last—Mr. H. S. PATTESON in the chair.

The SECRETARY (Mr. R. Cooper) read the following report of the directors:—

The accounts of capital and revenue for the half year ending the 29th of September last, now read, have been carefully investigated by the auditors, who have certified to their correctness in the usual manner.

After payment of working expenses, debenture interest, and dividend on the preference shares, and including the balance from the previous half year, there remains a sum sufficient to pay a dividend on the ordinary charges at the rate of 6 per cent. per annum, deducting income-tax, leaving a balance of £378 0s. 2d. to the credit of the next half year's account. The directors have, therefore, declared a dividend at that rate, which will be paid to the shareholders on the 2nd of February.

The directors have great pleasure in announcing this increased dividend for the last half year, and have every confidence that the same rate will be maintained.

The directors who retire by rotation are Messrs. H. S. Patteson, S. Grimmer, and R. Fitch, who, being eligible, offer themselves for re-election.

The company's works are in a very effective condition, and the business is quite satisfactory.

The CHAIRMAN, in moving the adoption of the report, said he had only to congratulate the shareholders upon the very satisfactory condition of the company and of their works. The shareholders were, no doubt, glad that the directors were enabled this half year to declare a dividend of 6 per cent., and to leave, within a few pounds, the same balance as at the corresponding period of last year. Besides this, the directors had been able to lay by £200 towards the sum they were reserving for putting in new boilers. The rates had been increasing satisfactorily, for they were more by £200 or £300 than at the corresponding period of 1876. That morning he accompanied Mr. Hawksley, the company's engineer, over the works at Lakenham and Heigham, and he was pleased to see their beautiful condition. In the covered reservoir, built six years ago, there were 14 feet of water, and, on getting accustomed to the light, he could see every brick, for there was no sediment of any kind.

Mr. BACON seconded the motion, which was unanimously adopted.

The retiring directors and auditor were re-elected.

Mr. HAWKSLEY stated that since he last addressed the shareholders nothing had happened in the engineering department of the company's works which bore in the slightest degree an unfavourable aspect. The works were in a state of the highest efficiency, there was perfect order in every department, and the water was undoubtedly excellent. He did not know what he could say further to assure the meeting of the soundness of this undertaking from an engineering point of view. Having looked at the accounts, he could state that the company were now, and appeared likely prospectively to be more so, in the very best financial position.

Mr. BACK moved that the thanks of the directors and shareholders be given to Mr. Ayris for maintaining the efficiency of the works.

Mr. PYMAR, in seconding the motion, said that the company were much indebted to Mr. Ayris for so assiduously looking after the works.

Mr. GRIMMER testified to the energy Mr. Ayris at all times displayed, and said that some years ago, before Mr. Ayris took these works in hand, he received no dividend; but since Mr. Ayris had been manager, the dividend had been gradually increasing from 1 to 6 per cent.

The motion having been adopted,

Mr. AYRIS thanked both the directors and the shareholders for the confidence they placed in him, and said that he was glad to meet them now that a dividend of 6 per cent. had been declared—the maximum dividend they could receive, and which he hoped the shareholders would receive for many years to come.

After some conversation on an inquiry respecting the payment of back dividends and the publication of the accounts,

A vote of thanks was given to the chairman and directors, with which the business terminated.

WIMBLEDON WATER SUPPLY.—The Local Board of Wimbledon, which is supplied by the Southwark and Vauxhall Water Company, are taking steps to secure a water supply of their own, from artesian wells. Mr. Homersham, C.E., has been consulted, and has given a decided opinion that a pure and ample supply could be obtained, from wells to be sunk at Wallington, for about £55,000.

RICHMOND WATER SUPPLY.—At the meeting of the Richmond Select Vestry on Tuesday last, Mr E. Hertslet moved that the reading of the minutes of the Water Supply Committee should be deferred until the next meeting, on the ground that, if then read, too much information would be given to their opponents, the Southwark and Vauxhall Water Company. He said that the officials of the company were on the alert to take advantage of the difficulties of the vestry, and alleged that they had thrown money into the trenches in the streets, in order to betray the labourers employed by the vestry from their allegiance. Mr. Maxwell opposed the motion, and reminded Mr. Hertslet that even if it was as he said, the power to bribe would remain with the water company, whether the minutes were read or not read. He knew as a fact that the greatest possible misery prevailed right and left, and he believed there would be, at the proper time, a deputation representing the poor cottagers of the town left day after day without water. Some of them had to go up to Mount Ararat, a distance of nearly half a mile, to get water. This matter was very serious. They had already drawn from the Local Government Board £22,000; they had as yet paid over £19,176; they owed £1040 more, which they were bound to pay without hesitation, and, as a real matter of fact, they had at this moment only a small balance of something less than £7500 in hand after the cheques of the day were paid, with which to carry on and complete the entire water supply of the town. In such a matter there should be no secrecy, unless it could be shown that secrecy would be to the advantage of the ratepayers. What was wanted, to give peace and security to the town, was knowledge. There were a variety of statements as to the sources of supply. He knew nothing about it himself, but he heard that the well, for which £500 had been paid yielded nothing to the town at present. It could not benefit Mr. Rumble, the engineer of the water company, or anybody else, that the truth should be known. As a matter of fact, the promises made to him (Mr. Maxwell) personally, with regard to the water supply, were broken. He knew it well, having in his house very serious illness, for which baths were prescribed. He appealed to the water company, and they certainly behaved most courteously and kindly to him, and he felt thankful to them for it. About 80 families, tenants of his, were none of them supplied, and in Marchmont Gardens the supply was ridiculously insignificant. Some of the servants who had to drudge to get the water were giving notice right and left. The chairman said the short supply in some cases was owing to the fact that some people bribed the watermen to favour their own tenants. He himself had suffered from the want of water, but he believed that the committee were doing their very best, and he, for one, was willing to put up with the inconvenience. The motion to defer reading the minutes was agreed to by a large majority. It is stated in a local paper that the vestry are progressing with their work as fast as possible. Out of 2200 houses the pipes have been connected at 1895. There is a large supply of water in the reservoir, and the vestry have obtained the consent of the proper authorities to take water from springs in Richmond Park. These springs are of excellent quality, and the supply is abundant.

LEEDS CORPORATION GAS SUPPLY.

Mr. Henry Woodall, the gas engineer of the Corporation, has just presented the following report to the Gas Committee:—

Mr. Chairman and Gentlemen,—In accordance with your instructions, I have pleasure in submitting the following report on the question of improving the quality of the gas.

As you are aware, the corporation are at present under parliamentary obligation to supply gas having a minimum illuminating power equal to 16 candles; the candles burning at the rate of 120 grains, and the gas at the rate of 5 feet per hour.

The questions now to be considered are as to the desirability of improving upon this prescribed standard; to what extent, and at what cost, can the improvements be effected?

In the first place, then, I have to remark that even between experienced operators, and with the most improved apparatus, it frequently happens that variations occur to the extent of half a candle in experimenting upon the same gas. It may, therefore, be fairly questioned whether it is possible with the unassisted eye to estimate the quality within one candle, even when observing the light emitted from the same burner from day to day. But if the quality is to be judged upon a variety of burners, the difficulty becomes far greater, one burner giving as much as 200 per cent. more light from a given quantity of gas than another. Again, it must be remembered that 16 candles is the minimum quality, and that it is impracticable always to manufacture gas (especially where a proportion of cannel is required) within a range of less than one candle, so that gas may be 16 candles one day, and in excess of 17 candles on the day following.

Bearing these facts in mind, it will be evident that to be appreciable to the public the standard of illuminating power must be increased by not less than 2 candles.

Now, as to the cost; and, in submitting the following estimate, I have to remark that it closely coincides with a calculation I made twelve months ago, when prices of coal, cannel, coke, and other residuals, varied considerably as compared with those now current. On the former occasion I found the cost to be 1·5d. per candle per 1000 feet, as against 1·41d. to-day.

Common Coal estimated to produce 10,000 *Feet of* 14-*Candle Gas, costing* 9*s.* 2*d. per Ton. Cannel estimated to produce* 10,000 *Feet of* 21-*Candle Gas, costing* 16*s. per Ton.*

10,000 feet of coal gas	=	480	lbs. of sperm.
10,000 feet of cannel	=	720	,, ,,
10,000 feet of 16-candle gas	=	548	,, ,,
10,000 feet of 18-candle gas	=	617	,, ,,
Difference between the value of 16 and 18 candle gas	=	69	,, ,,

	s. d.	s. d.		s. d.	s. d.
Coal costing per ton		9 2	Cannel costing per ton		16 0
Yields—			Yields—		
Coke, 6½ chald. at 4d.	2 2		Coke, 6 chald. at 3d.	1 6	
Tar, 11 gals. at 2·7d.	2 6		Tar, 10 gals. at 2·7d.	2 3	
Liquor, 28 gals. at ·76d.	1 9		Liquor, 20 gals. at ·76d.	1 3	
	6 5			5 0	
Cost of coal to produce light = 480 lbs. of sperm		2 9	Cost of cannel to produce light = 720 lbs. sperm		11 0
			Deduct for 480 lbs. sperm		2 9

Cost of difference between product of cannel and coal = 240 lbs. = ·41d. per lb. 8 3

Difference between value of 16 and 18 candle gas = 69 lbs.

69 lbs. at ·41d. per lb. = 28·29d. for 10,000 feet, or 2·82d. per 1000 feet for 2 candles.

The present price of gas is 3s. 3d. per 1000 feet, subject to discounts to large consumers, and a concession on the quantity supplied to public lamps, reducing our income per 1000 feet sold to 3s. 1d.

But any increase in the illuminating power would have to be over all the gas manufactured, and not merely over the quantity sold. It is necessary, therefore, that the calculation should be made on the greater bulk. Our income from gas, calculated on the quantity made during the year ending June, 1876, was 3s. per 1000 feet. Since that date, the price has been reduced to consumers by 6d., or say 5d., per 1000 feet over all gas manufactured, making the net income at the present date but 2s. 7d.; or, supposing our gas to be equal to 17 candles (which is nearer the fact than 16), then the price now paid is at the rate of 1·8d. per candle per 1000 feet made.

Looked at from this standpoint only, there would be a clear gain to the public by increasing the quality equal to the difference between 1·8d. and 1·41d. per candle, or ·8 of a penny per 1000 feet for 2 candles.

But it is necessary to inquire further, over what portion of the gas supply would an increase in the illuminating power of the gas be appreciable or valuable. In order to acquire data on this point, I took account yesterday of the gas manufactured between the hours of 9 a.m. and 3 p.m., that is during those hours when gas is least required as an illuminant; and I also had observations made, at all the gasholder stations, of the increase or decrease in stocks.

It transpired that during those hours we sent out 1,107,000 feet, or just 21 per cent. of the total delivery during 24 hours. It must be admitted that the morning was dull, and that for half an hour extremely so; but the 6 hours, as compared with the weather of the past two months, were a fair average. Now, this quantity only included the leakage pertaining to 6 hours out of the 24; to it, therefore, must be added that of the remaining 18 hours, and estimating at 10 per cent. on the winter months, as against 16 per cent. on the year round, we have a further addition of 420,000 cubic feet; added to this there is a *pro ratâ* consumption for all manufacturing, heating, cooking, and miscellaneous purposes during the remaining 6 working hours of the day; and again, the numerous lights in bed-rooms and passages during the night, also 400,000 feet to public lamps. Looking at the matter as dispassionately as I can, I feel persuaded that the quantity of gas consumed, upon which the suggested improvement would be appreciated, would not exceed one-third of the quantity made. If such is the case, then the 1·41d. per 1000 would have to be paid over 10,000 feet, while only beneficial over 3300 feet; or, in other words, 4·23d. would have to be expended to yield an advantage of 1·8d. I have not by any means exhausted the question, but will only throw out a few suggestions upon the case.

The supply of cannel is very limited as compared with that of coal, and any increase in the quality of gas must rapidly enhance the value of the former. Coke is not commanding the relative price that it used to do, and if it is not to become an absolute drug in many localities, its quality must be kept up by limiting the admixture of that from cannel. Gas is yet but in its infancy, and must inevitably be in increasing demand for many purposes other than lighting, and it is essential, therefore, to the manufacturer, as well as to the householder, that the price should be kept down to the lowest limit consistent with the reasonable requirements of the public.

Beyond all, however, I submit that it is unreasonable to increase the quality of gas by 2 candles, at a cost of not less than £10,000 a year, to improve the average light from, say, 10 to 12 candles (in thousands of instances it would only be from 6 candles to 8), when, by the expenditure of a few pence any person may derive the full value of 16 candles, or treble the advantage.

PROTEST OF THE CANADIAN GAS COMPANIES AGAINST THE STRINGENCY OF THEIR GAS ACT.

[From the *American Gaslight Journal.*]

Last year a few representatives of Canadian Gas Companies met Mr. Brunel, Commissioner of Inland Revenue, at Ottawa, to protest against the very stringent conditions of the Sales of Gas Act, as regards sulphur other than sulphuretted hydrogen, and against the exorbitant fees fixed for officially testing gas-meters.

After a most careful hearing, the commissioner requested that the views of the deputation be reduced to writing, and presented to him for further consideration. The following is the text of the protest submitted, which will be found of considerable interest to our readers as regards the sulphur bugbear. The authorities quoted are certainly of high standing, and should carry conviction—

To A. Brunel, Esq., Commissioner, Inland Revenue Department, Ottawa.

Dear Sir,—When certain of the undersigned, as a deputation representing the gas companies of the Dominion, had the pleasure of waiting on you at Ottawa recently, to urge the abrogation, or, at any rate, the relaxation of the exceedingly stringent Orders in Council of the 12th of February last, in respect of the amount of sulphur other than sulphuretted hydrogen, and ammonia, permissible in the gas to be supplied hereafter in the Dominion, and also to protest against the exorbitant scale of fees fixed for officially testing gas-meters; while receiving the deputation very courteously, and patiently hearing all the objections made, you asked that the objections might be put in writing. We, therefore, hereby beg to comply with your request.

Sulphur.—We respectfully submit that the sulphur remaining in gas freed from sulphuretted hydrogen, while very difficult and expensive to remove, is so infinitesimal as to be without any perceptibly injurious effects, and that its presence is, indeed, so innocuous as never to be objected to, or even suspected, by the consumer. Dr. Versmann has shown that three lucifer matches burnt in the course of an evening produce as much sulphurous acid as the whole evening's consumption of gas in a room. Dr. Odling, Fullerian Professor of Chemistry at the Royal Institution, London, in a lecture delivered in June, 1868, shows conclusively of how little account this sulphur bugbear is. He said:

"I am altogether at issue with the public when they maintain that the sulphur of gas produces by its combustion oil of vitriol, or that the amount of sulphur ordinarily contained in gas is of any consequence whatever; and a little consideration will, I think, satisfy you of the soundness of this position. We will assume that coal gas contains, not 20, but 40 grains of sulphur in 100 cubic feet—a quantity, at any rate, greatly exceeding the reality. Now, making another extravagant assumption—viz., that the whole of these 40 grains of sulphur would be completely burnt, and, in reality, they would be burnt very incompletely—they would furnish by their combustion 80 grains of sulphuretted acid gas. This quantity of the produced sulphurous acid would occupy, at ordinary temperatures, about 1-15th of a cubic foot; and, since 100 cubic feet of our coal gas give 1-15th of a cubic foot of sulphurous acid, 1500 cubic feet of coal gas would be required to furnish one cubic foot of the acid, even upon the extravagant assumption we have purposely made. But the combustion of 1500 feet of coal gas would produce something besides sulphurous acid. It would produce at least 1000 cubic feet of carbonic acid, and, in addition to its dilution with other gases and vapours, we should have our sulphurous acid diluted by 1000 times its volume of carbonic acid. Now, if we get at the proportion of carbonic acid in the atmosphere of a room highly illuminated with gas, and take the thousandth part of that proportion, we shall be able to form some notion of the amount of sulphurous acid present. You will remember that the amount of carbonic acid furnished by the breath of one individual is equal to that furnished by two 3-feet gas burners, and that the maximum amount of carbonic acid found in the atmosphere of a crowded theatre was 0·32 per cent. Now if, in addition to our previous unreasonable supposition, we further suppose that an atmosphere contains 0·2 per cent. of carbonic acid, furnished by gas combustion, you will see that the whole matter becomes a *reductio ad absurdum*, that we might actually have one half-millionth part of sulphurous acid present in the air of a gas-lighted room."

Dr. Schilling also says, in his *Journal für Gasbeleuchtung* for 1869: "Twenty grains of sulphur in 100 cubic feet of gas are entirely unobjectionable. Under the most favourable circumstances, with no ventilation whatever, it would give the atmosphere of a room only one part of sulphurous acid in 500,000 parts of air."

It will be thus seen that, even as a chemical fact, any supposed injurious effects of the presence of sulphur in the gas wholly vanish. In England, where the necessary skill and the requisite appliances are readily obtainable, the sulphur compounds other than sulphuretted hydrogen are entirely disregarded outside of London and two or three other large cities. We, therefore, submit that restricting the sulphur to the limits imposed in London, where, with all their advantages, keeping it within such limits has been the exception rather than the rule, in a country like Canada, subject to such extreme variations of climate, is vexatious and unnecessary, and we hope the Orders in Council in respect thereto will be wholly reversed or largely modified.

Ammonia.—If, as has been shown, stringent regulations in respect of sulphur in the gas are uncalled for, they are as surely equally so in the case of ammonia. A small quantity of ammonia in the gas is of itself not only unobjectionable, but is rather an advantage in the combustion of gas, in combining as an alkali with the aforesaid sulphur compounds, and so neutralizing their supposed injurious effects by the probable formation of a trace of the harmless product sulphate of ammonia. Like sulphur, it is disregarded in English gas legislation, except in London and a few other places. In such of the States of America where restrictions are imposed, we understand the limit to be five grains in 100 cubic feet of gas, and we respectfully suggest that a like proportion be the minimum in Canada.

Fees for Testing Meters.—Notwithstanding your replies to the serious objections urged on this question by members of the deputation at the interview with you, it is still hoped that you will be able to see your way to a reconsideration, and the recommendation of a considerable reduction in the published scale. The excess over the official prices charged in England, in the usual sized meters, is more than 300 per cent. The exorbitant charges will be a very serious and constant tax on gas companies. In the case, for instance, of the New City Gas Company of Montreal it will, including labour in unfixing and refixing meters, amount to at least 2000 dollars per annum, and proportionately so with other companies. It is, therefore, hoped that such alterations will be made in the proposed arrangements as will effect a considerable reduction in this serious outlay.

New Gas and Water Companies.—The Daventry Water-Works Company were registered on the 18th ult., for taking over, improving, and carrying on the Daventry Water-Works, situate in the parish of Daventry, Northampton, with a capital of £3000, in £10 shares. The Bargoed Gas and Water Company were registered on the 22nd ult., for the construction of the necessary works for supplying gas and water to the inhabitants of the village of Bargoed, parish of Gelligaer, county of Glamorgan, and its vicinity. The capital is £20,000, in £10 shares.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

Consequent upon the more pacific appearance of Eastern politics this week, there has been somewhat more spirit shown by buyers, and a resultant slight improvement in the amount of business done.

Pig iron is tolerably steady all round, and the leading houses are now pretty well sold forward, especially in foundry brands. Agents for the North Yorkshire producers now quote the following prices at works:—No. 1 foundry, 49s.; No. 2 foundry, 49s. 6d.; No. 3 foundry, 46s.; No. 4 foundry, 45s; No. 4 forge, grey, 44s. 6d.; No. 5 forge, mottled, 44s.; No. 6 forge, white, 43s.; refined metal, 62s. 6d.; Kentledge, 50s.; and cinder pig, 40s.; all per ton, net. Messrs. Stevenson, Jaques, and Co.'s (Middlesbrough) "Acklam" brands of pig are—No. 1, 49s.; No. 3, 47s.; No. 4 foundry, 46s.; and forge, 46s., in trucks. Other northern pigs are similarly priced.

North Lincolnshire brands continue firm, although the production of that locality is on the point of being augmented by the starting of four additional furnaces—two by the Redbourne Hill Company, and two by the new Appleby Iron Company. "Redbourne" No. 1 is now held at about 60s.; No. 2, 56s.; No. 3, 54s.; No. 4 foundry, 54s.; No. 4 forge, 51s.; M & W, 50s. per ton. Derbyshire and South Yorkshire brands are steady at late rates.

I understand that several good pipe orders have been placed in this vicinity within the past few days, one leading concern having received such an encouraging quota that a number of extra men have been put on, in those departments. Generally speaking, however, there is not much change to note in the state of the manufactured iron trade, there being very little work in hand at the iron forges, although there certainly appears to be a change for the better in the Bessemer trade.

The Wingerworth Coal and Iron Company, Derbyshire, are said to have decided to suspend the working of their ironstone mines and collieries for the present, owing to the depression of trade.

At several of the leading South Yorkshire collieries men are being discharged, and at others wages are being lowered. Trade in coal, in fact, rules so quiet that at hardly any of the local and district pits do the working days reach three weekly. Under such circumstances, and with the existing glut of the market, it is almost superfluous to remark that prices are so easy that patient and persistent buyers are enabled to have matters pretty much their own way. Steam coal is perhaps the exception, and even that is not "on a dead level" at the list rates.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

There is no improvement to report in the condition of either the coal or iron trades of this district, the depression in both branches of industry being, if possible, more marked than ever. The relapse of the coal trade from the inflation which existed two years ago has been more complete than any one could have anticipated, and colliery proprietors are now in a worse position than during the period of depression which immediately preceded the great rise in values in 1873 and 1874. For some classes of coal lower prices have now to be taken than those ruling in 1870–1, whilst the permanent cost of production has since been increased fully 1s. per ton, by the restrictions of the Mines Regulation Act. Wages are also higher, and the men work shorter hours. Very much the same thing has taken place in the iron trade, and makers complain that it is impossible to produce the iron at the prices which are now offered.

All classes of coal continue abundant in the market, and colliery proprietors, although nominally they have made no change in their list rates, are unable to maintain late prices. Large quantities of round coal have been thrown upon the market by the exceptional mildness of the season, and stocks are accumulating, the present production being considerably in excess of the demand. Common coal is also difficult to sell, and for large export orders very low prices are being taken, common coal, at the High Level, Liverpool, being offered at 7s. per ton. Common engine coal also continues a drug, and slack is being delivered at the chemical works at a price which does not leave more than about 2s. 3d. per ton at the pit. The average prices at the pit mouth in the Wigan district range about 10s. 6d. to 11s. per ton for good Arley, 8s. 6d. to 9s. for Pemberton four-feet, 6s. 6d. to 7s. 6d, for common coal, 5s. 6d. for burgy, and 2s. 6d. to 3s. 6d. per ton for slack.

In the iron trade local makes are still being kept out of the market by the low price at which sales of north country iron are being pushed here by merchants who have evidently large stocks on hand, upon which they are compelled to realize. Finished iron is also quiet; and manufacturers who have orders on their books find it difficult to obtain the specifications from merchants. Quotations remain at about £6 15s. to £7 per ton for bars delivered into the Manchester district.

The long-deferred award on the Oldham colliers dispute has at length been given. The men some months back made an application for an advance of 2d. in the 1s., which was the amount of a reduction which had been made a short time previously; but the arbitrator has decided that the wages shall neither be increased nor reduced.

The Lancashire coal merchants, at a numerously attended meeting held at Manchester on Tuesday last, decided to form an Association for the protection of their interests.

THE COAL AND GENERAL TRADE OF THE NORTH.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of the North of England does not improve as the year progresses. It has fallen back into quite a dull state, and the prospects of much good spring trade are very moderate indeed. The house coal trade is doing very badly. In the early part of the winter the south country merchants laid in pretty heavy stocks, and as the season has been remarkably open and mild they have not got quit of them as they would have liked, and they have not been able to put any fresh orders in the market of any value since the new year. The quotations are comparatively low. They are little more than 11s. 6d. per ton for best qualities, and from 1s. to 1s. 6d. per ton lower for second sorts. The shipments of best gas coals from the Tyne Dock are a moderate average. They are mostly taken off by steamers. There is not much demand for small coasters in this trade. The prospects of second-class gas coals were not so good last week as the week before. The iron trade did not look so strong, and the second-class gas collieries of the county of Durham will be, and are, a good deal governed by the state of things in the iron trade of the North of England. The steam coal trade of Northumberland continues in a very poor way. The collieries are working short time throughout. The pitmen are badly employed, and their wages are miserable enough at present.

Coal freights generally are lower. There was actually no demand for sailing coasting vessels last week. Rates to the east coast and the Channel ports were extremely flat. They ranged from 4s. 3d. to 4s. 9d. per ton for steamers to load coals for London. There is very little business opening for the Baltic, and outward trade to the Mediterranean is falling off. There are very good shipments of coke to Spain and Africa.

The timber trade is duller than it was. House-building is falling off in all the large towns of the North of England. The principal deliveries of timber at present are for the collieries; but a large amount of timber may be expected in the coal ports as soon as the Baltic reopens. A better business is transacted from Spain and Africa in Esparto grass, copper, and iron ore. The general manufacturing trade of the Tyne and Wear is comparatively dull. The principal manufacturing houses have their agents and travellers upon the Continent looking up business for the year; but foreign merchants show an indisposition to enter upon contracts for forward delivery.

The manufacturing iron trade has been checked; the uncertainty which surrounds everything connected with the Eastern Question keeps all speculation back, and business gives strong indications of falling into the same dull, inanimate state which characterized it during the whole of last year.

The wages of workmen are lower a good deal than they were in the time of excessive prosperity in the districts; but they are still very much in excess of what they ought to be, considering what a profitless affair the coal trade and manufacturing business of the North of England was to the coalowners and manufacturers last year.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

Mr. J. Falconer King's report of his analysis of the gas supplied to the City of Edinburgh on the 18th of January showed that the illuminating power of that furnished by the Edinburgh Company, expressed in standard candles, was 29·91, and that of the Leith Company 30·24.

A slander case of some interest has been raised in the Court of Session, which may be mentioned here, as it has arisen in connexion with the gas affairs of Forfar. The alleged slander complained of took place in the course of a newspaper correspondence with reference to the cost of gas in that town. Both of the parties, Lowson and Rutherford, were members of the Town Council of Forfar, and the pursuer, Lowson, who is a coal merchant, was convener of the Corporation Gas Committee. He was accused in one of the letters written by the defender, in respect of his influence in the Gas Committee, of accepting gratuities, commissions, or "backsheesh," from some or all of the contractors who supplied, or offered to supply, the gas coal to the corporation, given in order to obtain his influence for the acceptance of their offers, or at least connived at the acceptance of gratuities by others. The following is the issue which has been agreed upon by the counsel for the parties, and accepted by the Court:—"Whether the said letter, or part thereof, is of and concerning the pursuer, and falsely and calumniously represents the pursuer as having accepted gratuities for using his influence, in his capacity of a member of the said Gas Committee, for procuring the acceptance of offers to supply coal to the gas-works belonging to the said burgh, or permitted others to accept gratuities for the said purpose, to the loss, injury, and damage of the pursuer?"

The complaints about bad gas have now reached the town of Kilmarnock, where the supply is in the hands of the corporation. One indignant grumbler writes to say that somebody is to blame. He does not say whether or not he is to blame himself for not having his burners in a proper condition. He goes on to say: "Let the right man look out, for positively we must sell out again if our corporation cannot do better for us than this."

On the evening of Thursday last, the populous weaving and mining village of Dreghorn, near Kilmarnock, was lighted for the first time with coal gas, the event being celebrated by a public dinner at the "Crown" Hotel. The new works have deen designed by, and constructed under the superintendence of, Mr. S. Dalziel, manager of the Kilmarnock Corporation Gas-Works.

An attempt at keeping down the gas account has just been detected at Aberdeen, and due punishment awarded. At the Aberdeen Police Court on Thursday—Baillies Smith and Macdonald on the bench—William Wishart, engine-fitter, residing in St. Andrew Street, pleaded guilty to having fraudulently prevented the index of the gas-meter in his house from registering the quantity of gas consumed. He had undone the couplings of the meter, and attached an india-rubber tube to the pipe, and had not allowed the gas to pass through the meter so that it could have been registered on the index. Baillie Smith, in passing sentence, said accused had put his ingenuity to a very disgraceful purpose—that of defrauding not only the Gas Commissioners, but the public of the city. There was a meanness about it, as it had been done with the intention of making his gas account as small as he possibly could without suspicion. He had, however, been suspected, and the gas officials had found the tube attached to the pipe. As it was the first offence, and he hoped it would be the last, the accused would have to pay a fine of 40s., with the alternative of 20 days imprisonment.

The Town Council of Hamilton had the subject of the gas accounts under consideration at their usual monthly meeting, last Thursday. A minute from the Gas Committee recommended payment of accounts, amounting £915 17s. 8½d., of which nearly £700 had been incurred for pipes that had been laid down in Almada Street, Quarry Street, and Union Street. Several members of the council complained of the dilatoriness displayed in the preparation of the balance-sheet, and in the course of the conversation it was stated that the last balance was reported to a meeting of council in June, 1874. The discussion dropped, on the understanding that the financial statement would be forthcoming at next meeting.

Dr. Wallace, in reporting on the quality of Glasgow gas during the week ending the 27th of January, gives the lowest minimum illuminating power at 24·74 candles, the lowest average at 25·99 candles; the lowest maximum at 26·04 candles, and the highest at 28·20 candles. The question of the illuminating power of the gas having been under the statutory minimum several times during the last month or two was lately under the consideration of the magistrates, and a communication from them was brought under the notice of a recent meeting of the Sub-Committee on Works. Mr. Foulis stated that the recent low illuminating power had been caused, to a large extent, by the coals having been delivered wet, and it being necessary to use the same at once, in consequence of the storeage accommodation at the works being inadequate, and the stock of coals nearly exhausted. Thereafter the chairman, and Councillors Dron, Finlay, and Mathieson were appointed a sub-committee to consider the whole question of providing additional coal storeage, and to report.

At last Thursday's meeting of the Town Council of Glasgow, a conversation arose in regard to alleged incivility on the part of the clerical officials at the corporation gas office. Speaking upon the subject, Treasurer Osborne said that there was no doubt but conduct of the kind complained of was very high-handed and discourteous, not only to consumers, but to the public, who were the masters of the officials. He thought that the Gas Committee should draw the attention of the responsible officials to such conduct.

At a recent meeting of the Sub-Committee on Works, Mr. Foulis read a report by him, drawing attention to the great loss of gas arising from leakage in the pipes laid throughout the city, stating that the apparent cause of this leakage was excessive pressure, and pointing out how this over-pressure might be obviated, or at least diminished, by dividing the city into districts and putting down governors in each district, in the manner indicated on the plans also submitted. After some conversation on the subject, the meeting appointed Messrs. Miller, Finlay, and Smith

a sub-committee to consider the whole matter, and report, Mr. Finlay to be convener.

Forfar is still in the "throes" upon the water question, but there is now really a prospect that something will be done, or, at all events, promised, by the local authority to amend the condition of things which has so long prevailed, and brought disgrace and disrepute upon the town.

The "first sod" in connexion with the Bruntisland Water-Works was cut last Wednesday. It is expected that the water will be introduced into the town by Midsummer, 1878. Mr. John Sang, C.E., Kirkcaldy, has been appointed to superintend the works throughout.

The contractors for the Cupar Water-Works have lately put in a claim for extras to the amount of fully £3000, and a claim from the Earl of Glasgow, who has property in the line of works, is also under consideration.

Nothing new of any special importance has to be reported regarding the iron and coal trades. The price of pig iron has fallen again about 1½d. per ton.

Gas Explosion at Barnsley.—On the 29th ult. an explosion of gas occurred at a house in Shambles Street, Barnsley. While some men were putting in a larger meter, the gas by some means became ignited, and exploded, blowing a large pane of plate-glass out of one of the windows, and doing other damage. One of the workmen was injured.

Broadstairs Water Company.—The annual meeting took place on Tuesday, the 30th ult. The affairs were stated to be in a satisfactory condition; a dividend of 3½ per cent. was declared (making 6 per cent. for the year), and £559 were carried forward. On the authority of Dr. Frankland, the water was said to be of excellent quality, now that the new works are in operation. At a subsequent extraordinary meeting, it was resolved to raise £1500 new capital for the purposes of extension.

Darlington Corporation Gas-Works.—At the meeting of the Darlington Council on the 1st inst., the manager of the gas-works reported that he had put regulators on to the public lamps, which had reduced the waste of gas. The quarter after the regulators had been fixed the unaccounted-for gas was reduced from 23 to 14 per cent. The Mayor, Mr. Morrell, and other gentlemen, spoke of the lighting of the streets being defective; but this Alderman Kitching said was due to the distance between the lamps, which should be closer together.

Colne Gas Company.—On the 30th ult., a meeting was held at Colne of ratepayers and owners of property, to consider the question of the Colne Local Board opposing a Bill, now before Parliament, of the Colne Gas Company, for an extension of their powers. It was stated that the local board had offered to pay the company over £32,000 for the works, the capital of which only amounted to £13,500, but that negotiations had fallen through, because the gas company wanted to be paid costs, in addition to that amount,. After a good deal of lively discussion, it was resolved that money be taken out of the district rate to oppose the Bill.

Manchester District Association of Gas Engineers.—The 29th quarterly meeting of the members of this Association took place on Thursday last, at Stafford—Mr. John Storer, the president, in the chair. During the day a visit was made to the Stafford Gas-Works, with which the company expressed themselves satisfied, and Mr. Hunter, of the Salford Gas-Works, stated that for efficiency and capacity they were equal to any in the kingdom. The principal topic of conversation during the afternoon was the approaching purchase of the gas-works by the Town Council. The meeting separated soon after six o'clock.

Manchester Water-Works.—The finishing touch has been given to the gigantic works in the valley of Longdendale, by which Manchester is supplied with water. These works have been in course of construction about 28 years, and have cost no less a sum than £2,500,000. The area of the reservoirs already constructed is 603½ statute acres, and they have an aggregate capacity of 4598 million gallons. Five other reservoirs, for which an Act of Parliament was obtained in 1875, are about to be commenced at Denton and Audenshaw, and these will occupy an additional 372 acres, and will have a storeage capacity of 1860 million gallons.

Sale of Gas Shares.—At a sale by auction at Ipswich, a week or two ago, four old £10 shares in the Ipswich Gaslight and Coke Company, upon which a dividend of 10 per cent. has been paid for many years, were sold at £23 per share. At the same time, 15 new £10 shares in the company, upon which a dividend of 7½ per cent. has been paid for many years, were sold, four at £15 15s. each, and 11 at £16 each. A sale of shares in the Malton Gas Company took place last week—fourteen £10 shares, fully paid up, realized £20 2s. 6d. per share; fourteen £7 shares, fully paid up, realized £14 5s. per share; and eleven £3 shares, £1 paid up, fetched £3 10s. each.

Stealing Gas at Atherton.—At the Leigh Petty Sessions, on the 29th ult., a collier, named James Richards, of Atherton, was charged with connecting a gas-pipe to the meter on his premises without the consent of the local board. He was also charged with obstructing a board officer, Chas. Whittle, who went to examine the meter. Defendant refused to pay a deposit of 5s. required by the board from all fresh consumers, and in consequence of that the gas was cut off on the 20th ult., when the meter stood at 031. On Whittle and another servant of the board, named Manley, visiting the house afterwards, they found that the meter stood at 036, showing that 500 feet of gas had passed through the pipe since its disconnexion by the board. Defendant kicked Manley out of the house. He was fined 40s. and costs in each case.

Longwood Public Lighting.—At the meeting of the Longwood Local Board, on Wednesday last, it was resolved—"That the offer of the Colne Valley Gas Company, Limited, to supply the public lamps (where the said company's mains are already laid) at 10s. per lamp per annum be and is hereby accepted, subject to such company indemnifying this board for any sum that this board may have to pay to the Longwood Gas Company for any breach of contract to which this board may become liable; also subject to such first-mentioned company (in case of the connexions with the mains belonging to the said first-mentioned company being from any cause cut off) being at the expense of the re-connexions with the mains of the Longwood Gas Company; and also subject to the first-mentioned company indemnifying this board from all costs and expenses which this board may be put to (in litigation or otherwise) by the said Longwood Gas Company."

Malvern Link Gas Company.—The half-yearly meeting was held on the 1st inst.—Mr. T. Holland in the chair. The statement of the accounts for the half year showed a revenue of £973 4s. 11d., and an expenditure of £737 1s. 10d., leaving a profit of £236 3s. 1d., to which was added the balance from last year—namely, £18 2s. 9d., leaving a sum divisible of £254 5s. 10d. Mr. Haynes proposed that the dividend declared be £8 per cent., and Mr. Jones proposed that it be £7 per cent. Four voted for each proposition, when the chairman gave his casting vote in favour of £7 per cent., which was therefore declared carried. The following were elected directors:—Mr. A. Brown, Mr. Cook, and Mr. L. Bird. Mr. A. R. Warde was re-elected auditor. It was determined to advertise for the supply of coal to the gas-works for the future. An increase of £25 per annum was granted to the secretary of the company, Mr. Underwood, in consideration of the extra duties undertaken by him in the collection of the debts due to the company.

Fatal Gas Explosion at Dewsbury.—On Saturday, the 27th ult., an inquest was held at Dewsbury upon the body of John Smith, labourer at the Dewsbury Corporation Gas-Works, who was killed on Friday. Evidence was given by the two foremen, a labourer, and Mr. Craven, the engineer of the works, showing that on the previous morning, at twenty minutes to eight o'clock an explosion took place in the purifying-shed, blowing the building up, and committing serious damage to premises near. At the time of the accident the deceased was engaged stemming a joint in the engine-house, which was totally destroyed. Smith was afterwards found under the rubbish quite dead. The witnesses said they had not the slightest idea as to the cause of the accident, that a few minutes before the explosion they had been in the purifying-shed, and there appeared to be no escape of gas. Mr. Craven added that managers of various gas-works had been down, but no one had been able to form any opinion as to the cause of the explosion. The town clerk, Mr. Jesse Smith, said the corporation deeply regretted the occurrence, and were sorry that there was no clue as to the cause, for if there had been it might have, perhaps, enabled them to avoid a similar catastrophe in the future. A verdict of "Accidental death" was returned.

Glasgow Water Supply.—At the meeting of the Corporation Water Committee on the 22nd ult., Mr. Gale, the engineer, in his quarterly report, stated that during the past year 20 inspectors had been regularly employed in the house-to-house examination of the water-fittings, and the number of taps and other apparatus inspected was 350,270. Of these, 27,101 were found out of repair and wasting water, and 27,917 imperfect taps were inspected a second time, to find if repairs had been executed. The number of inspections made on complaints lodged at the office or information received was 10,825, and a second inspection was made of these cases to the number of 9398. Of the 10,825 complaints made of waste of water, 3629 were found to be caused by burst lead service-pipes, or an average of about 12 a day. This was exclusive of the operations in the Great Western Road experimental district.

Well-Sinking Extraordinary.—A local paper states that Hugmore Lane, near Wrexham, is the scene of a natural phenomenon of a singular character. Recently, Mr. Charles Edwards, of Hugmore Farm, commenced to sink a well within a couple of yards of his house. After sinking through the surface soil he got into a solid bed of clay, through which he sank over 10 yards, and while the man was still at work the water burst in about 4 yards above his head, and he had to escape as rapidly as possible. The well filled in a very short time, and then ran over in a regular stream, bringing with it a large quantity of quicksand. Every effort has been made to stop it, but hitherto without avail. The removal of the sand has caused a subsidence of the ground on which the house and part of the outbuildings stand, rendering them uninhabitable, and they will have to be rebuilt. A large staff of men have been engaged in filling the well, the material used being large stones embedded in hydraulic lime; but this has proved of no avail, and the torrent still rushes on.

Quality of the Newcastle-on-Tyne Gas.—Mr. John Pattinson reports the following as the results of his examinations of the quality of the gas supplied to this borough by the Newcastle-upon-Tyne and Gateshead Gas Company:—

Week ending Jan. 27.

Date—1877.	Illuminating Power in Sperm Candles.	Grains of Sulphur in 100 Cubic Feet of Gas.	Sulphuretted Hydrogen.
Jan. 23	13·8	7·95	Nil.
„ 26	12·5	6·59	Nil.
„ 27	14·9	—	Nil.

A Sugg-Letheby standard Argand burner is used in testing. According to Act of Parliament the gas should not be of less than 14 standard candles illuminating power, nor contain more than 17 grains of sulphur per 100 cubic feet of gas. On inquiry at the gas-works, it was found that a joint had been broken in the hydraulic main, thus accounting for the unusually low illuminating power of the gas this week. The broken joint was discovered and repaired on the 26th Jan. The gas at the date of report was again up to the usual quality.

Week ending Feb. 3.

Date—1877.	Illuminating Power in Sperm Candles.	Grains of Sulphur in 100 Cubic Feet of Gas.	Sulphuretted Hydrogen.
Jan. 30	14·3	6·09	Nil.
Feb. 2	14·0	6·83	Nil.

Barton District Local Board Gas Supply.—At the meeting of the board on the 29th ult., the clerk reported that, in accordance with the resolution of the board on the 9th ult., he had written to the town clerk of Salford, stating that the Barton Local Board had never ceased to be dissatisfied with the defective supply of gas, drawing attention to the report of the Salford Gas Committee respecting the alterations and extensions necessary in their gas-works, to enable them to provide for the proper supply of the borough and outlying districts, and referring to the evidence given on behalf of the Corporation in opposition to the Bill introduced by the Board some eighteen months since, for the purpose of obtaining power to supply the district with gas. His letter then went on to say that, on comparing the evidence mentioned, with the report of the Gas Committee, the Board felt more than ever justified in the action they took in endeavouring to obtain an Act empowering them to supply their own district, and could not refrain from expressing their conviction that had the real facts of the case been disclosed to the parliamentary committee the Board would have obtained their Bill. It was clear that the assertions made to the committee did not accord with the actual facts. It was admitted that without incurring an expenditure of £160,000 the Corporation could not supply the gas required for the borough and district, and he therefore intimated the Board's intention to take the necessary steps to obtain powers to supply their own district with gas. They wished, however, to come to an amicable arrangement, and desired to know whether the Gas Committee would grant them an interview. In reply he had received a communication from the town clerk, to the effect that the committee would be willing to receive a deputation upon a day named. After some discussion, it was resolved that a committee of six gentlemen should be appointed to meet the Salford Gas Committee.

Swindon Water-Works Company, Limited.—The report of the directors, submitted to the shareholders at their meeting yesterday, was as follows:—"The satisfactory character of the statement of accounts now laid before you requires but few remarks this year. The gradual accession of business which the rapid growth of the town naturally brings to this company shows what an important feature in the extension of this town, and the increase of the neighbouring villages of Gorse Hill, and Even Swindon, your water-works hold. The number of attachments to the mains for the supply of water to houses, &c., stands at 2272, being an increase of 372, of which number 124 are supplied from the new main at Gorse Hill. The number of orders for attachment now in hand is 84. During the latter

part of the year your directors considered that the company would be benefited by an increase of capital; they, therefore, with the consent of the shareholders, offered 5000 new £1 shares to the present holders of stock in proportion to their holdings. These shares were immediately taken up, and a much larger number applied for than it was possible to allot. A call of 7s. 6d. has been made on these shares. The net earnings of the undertaking this year are £1653 9s. Your directors recommend out of this sum a dividend (on the share capital of £15,000) of £7 10s. per cent. per annum, free of income-tax, which will amount to £1125; that the sum of £250 be placed to the credit of the Chancery suit account, and the balance of £278 9s. be placed to the contingent-fund account. During the year your directors have had to regret the loss, by death, of the very efficient services of the late Mr. R. Reynolds. He served the company with zeal and ability, and your directors have filled up the vacancy by appointing his son, Mr. W. Reynolds. Messrs. Wearing, Kinneir, and Mason will retire by rotation, but are eligible for re-election."

Hull Corporation Water Supply.—At the meeting of the Water-Works Committee on the 22nd ult., the engineer (Mr. Maxwell) reported that during the previous fortnight the quantity of water pumped from Springhead was 8,635,712 gallons; ditto at Stoneferry, 64,935,906 gallons; total, 14 days supply, 73,571,618 gallons. Average daily, 5,255,155 gallons. Coal consumed, 101 tons 12 cwts.; ditto per million gallons, 27·61 cwt.; cost of ditto, 15s. 2d. Ten days previously the second of the new bores was connected into the general system. They had now five bores at Springhead; average distance apart about 75 feet. The area of the two new bores was about equal to that of the three old bores, and they were sunk to a greater depth. He had estimated the cost of these bores, including adits, sluice-valves, and all fittings, at £2497 10s.; it really would be about £2340, and the bores were 100 feet deeper than originally contemplated. The committee, at their meeting on the 1st ult., instructed him to test the present available supply at Springhead. He had done so, and now reported as follows:—On the 12th ult., from 9 a.m. to 3 p.m., he put all three engines at work, keeping the wells down to the sucking point. The valve in the adit, between the old and new shafts, was shut down. By the old engines pumping from the old bores the yield was at the rate per day of 3,484,800 gallons. By the Woodhouse pumping from the new bores the yield was at the rate per day of 3,553,200 gallons; thus giving a yield per day of 7,038,000 gallons. Were this quantity available throughout the year he would not hesitate to say that the water supply from Springhead was amply sufficient for the next ten years. But at this season, and for the next few months, the springs were at their best. Seven million gallons per day now did not mean more—probably less—than six millions in the autumn and early winter months. Practically, they had no means for storeage, but depended on their supply from day to day. So, as the strength of a chain was its weakest link, the measure of the water supply was the capability of the springs when at their lowest yield. Again, the rainfall of last year had been very considerably above the average, and further, they could not practically, at their regular work, pump from the wells so low as in the above experiment. Supposing they could now count on six million gallons, how long were they safe with that as a supply? They were at present, even in this winter season, supplying 5¼ million gallons per day. He found from the reports that for the three years ending 1868 the daily supply was 3·6 million gallons; three years ending 1871, 4 million gallons; three years ending 1874, 4·5 million gallons; and for 1876, 5 million gallons. Hence the supply had, heretofore, increased half a million per day every three years. They would, at the same rate of increase, reach 6 million gallons per day in five years hence, certainly by the summer of 1882. But in such an important element in the health, comfort, and general prosperity of the inhabitants it would hardly be wise to run too fine. There had to be taken into consideration, first, the probability of the town increasing at a faster rate than in recent years; second, the probability of an occasional dry season; third, the event of a miscalculation in the time required to execute a scheme for increased supply. Taking all points into consideration, he submitted that it would now (even when the supply was greater than it had ever been previously), be advisable to set in earnest to the question of further supply, so that plans for the same might be matured during the ensuing summer. The report was ordered to be specially circulated among the members.

Newport (Mon.) Gas-Works Benefit Society.—The annual dinner and entertainment in connexion with this society took place on the 22nd ult., at the Royal Albert Hall. The chair was occupied by Mr. Canning, the engineer and manager of the works, the vice-chair being filled by Mr. John Whitefield, the secretary of the club. Nearly a hundred persons, comprising officers and men in the service of the company, with their wives and a few guests, sat down to an excellent repast, after which several toasts were given, interspersed with an excellent selection of songs and instrumental music. In responding to the toast—"Success to the Newport Gas-Works Sick and Benefit Society," the chairman remarked that when they met a year ago it was his pleasing duty to announce that the first trial of their club had been successful. It was then only an experiment; but the twelve months trial of it had been a very great success. The club had been the means of doing a great amount of good. He found, from looking over the returns, that something like 12 per cent. of the members had received sick pay, while only 2 per cent. out of the number had died. The club, he believed, with the exception of a few whom he might count on one hand, included all the working men employed at the gas-works. He thought, when he looked at the figures, that the employment most of them followed was not that unhealthy and obnoxious employment that people were sometimes pleased to call it. In June last they divided amongst themselves the profits, with pleasing results to most concerned. He was happy to say, from information which he possessed, that the balance at present at the bank showed that they would not have less at the coming year. The secretary read the balance-sheet for the half year ending Dec. 30. It showed the receipts for the six months to be £26 8s. 4d.; expenditure in sick payments and funerals, £7 19s. 5d.; balance at the bank, £11 5s. 6d.; amount in hands of the treasurer, £7 3s. 5d.; total balance in hand, £18 8s. 11d.; received this year, £3 3s., making a total of £21 11s. He said that the receipts for the first year were £46 12s. 6d., after paying for books, rules, cards, &c., in getting up the society, and all sick pay and funerals, and members that left the works receiving back half the money they contributed. At their annual meeting in the summer they shared amongst their members as dividend, so that they saw the society helped its members in every way. It helped them when they were sick, and their fellow-workmen visited them, and thus were made friendly and united in their sympathy for each other. It also helped them when they were leaving the employ of the company, for they have returned to them half their contributions to the society. Help was also given in the greatest time of need—death—when not only were the funds given towards burying the dead, but, through the kindness of their manager, workmen were allowed to go as bearers. He impressed upon the members the desirability of co-operating together if they wanted to be honest and industrious workmen. Let them have done with drunkenness, and bear in mind the motto, "United we stand; divided we fall."

Register of New Patents.

869.—Hallsworth, S., Armley, and Bailes, R., Woodhouse Carr, near Leeds, "*Improvements in purifying illuminating coal gas and in the preparation of the means employed therefor.*" Patent dated March 1, 1876.

This invention consists in the preparation and use of the residue that remains after iron pyrites are burnt in the manufacture of sulphuric acid. Also in the use of oxide of iron refuse that remains after the spent oxide obtained from gas-works has been burnt in furnaces.

To about two parts by measure of sifted or ground residue of burnt iron pyrites, or of burnt oxide of iron refuse, is added from about one to one and a quarter parts of sawdust or other equivalent, and the whole slightly moistened with water, and well mixed together. The material should be so moistened with water that, when pressed in the hand, it will ball together without wetting.

The compound is placed in the ordinary purifiers, and allowed to remain in them until it ceases to purify the gas, when it is taken out and spread upon the floor, and allowed to revivify and cool. It is slightly moistened with water each time before being used again. By these means it can be used over and over again, until it becomes so mixed with sulphur as to be too heavy for use.

876.—Blewitt, R. J., Upper Norwood, Surrey, "*Improvements in the method of obtaining gas for illuminating purposes, and of obtaining and applying the products of coal by distillation of the same.*" Provisional protection only obtained. Dated March 1, 1876.

[We give the provisional specification in this case in the applicant's own words.—Ed. J. G. L.]

Having discovered that the present system of obtaining gas for illuminating purposes and for the distillation of coal is founded on erroneous principles, I discard it altogether, and proceed as follows:—

By means of a hood, bottomless cage, or air-tight chamber, I collect the gas naturally emanating from coal, and by any kind of aperture, with tube and stopcock, let it out at once into a gasholder, from whence it may be conveyed to its intended destination in pipes of iron or bamboo (if I shall think fit to adopt the latter mode of conveyance according to the manner of the Chinese). In order to render the gas innocuous in a coal mine, I extract the same by means of a bore-hole and tube on the principle of that used for an artesian well, the tube to be two inches in diameter, and extending from the deepest part of the coal intended to be worked to such a height above the surface of the ground as may be possible or desirable. The gas may then be passed into a gasholder, and conveyed in pipes as before mentioned.

From the hold of a ship I extract the gas by a smaller bore-hole and tube through the deck, and by means of pipes convey it to any part of the ship for warmth, light, cooking, or signalling. Availing myself of the well-known effect of chlorine gas upon the olefiant gas, I propose, when I think fit, to convert the latter into an etherial oily fluid, which when ignited burns with a red light, and to use such fluid in a lamp or any similar contrivance.

I propose to obtain and increase the quantity of cyanogen and ammonia by promoting the separation of the nitrogen from oxygen in atmospheric air, and the decomposition of the hydrogen and oxygen in water, and by the decomposition of such elements. Instead of converting the sulphur usually contained in coal as iron pyrites or sulphuret of calcium into hydro-sulphuric acid gas, I extract the former by promoting and awaiting its decomposition and natural re-arrangement in strata, as described in a work on gas published by Mr. S. Hughes; and as to the latter I convert it by means of chloride of sodium, obtainable by the boiling and evaporation of sea-salt into sulphuret of sodium, one of the principal ingredients for producing an artificial lapis-lazuli or ultramarine. As the sulphur separated from the iron pyrites will be in a state of great purity, I dispose of it as a marketable commodity, and the iron or magnetic waste of iron also.

As to all the products arising from the distillations of coal, I produce them in the usual manner, but with far less expense, and without any of the offensive odours which accompany the present system.

934.—Wheeler, H., Birmingham, and Pearson, J., Handsworth, "*Improvements in direct-acting steam-pumps.*" Provisional protection only obtained. Dated March 4, 1876.

This invention consists in improvements in mechanism for actuating the slide-vales of direct-acting steam-pumps.

According to one modification these parts are constructed in the following manner:—In the steam-chest are formed two small cylinders, their axes being in the same line and parallel to the axis of the steam cylinder. The cover ends of these small cylinders, through which the piston-rods pass, are turned towards each other. The piston-rods at their ends carry tappets, which are jointed to the rods. The ends of the tappets when in their normal position are below the level of a projection on the slide-valve, and as the pistons advance their tappets bear against and carry forward the slide-valve in one or other direction. From the outside of the steam-chest screw-stops pass inside, and projections on the tappets strike against these stops when the small pistons have advanced to a greater or less distance, and by lifting their ends, disengage them from the slide-valve. The precise point in the strokes of the small pistons at which the tappets are liberated from the slide-valve is determined by the distance to which the screw-stops are advanced. On the return motions of the pistons of the small cylinders the tappets are restored to their normal position by striking against the covers of the small cylinders. Ports communicating between the steam cylinder and the small cylinders admit steam from the former into the latter at the required times, and also effect the exhaust of the small cylinders. The cover end of each small cylinder is in communication with the exhaust-pipe of the steam cylinder. By the motion of the piston of the steam cylinder the small cylinders are supplied with steam, and exhausted at the required times for the proper working of the slide-valve of the steam cylinder.

According to another modification, the small cylinders are arranged with their axes at right angles to that of the steam cylinder, and parallel with one another. The ends of the piston-rods of the small cylinders carry inclines, which act respectively on arms having motion in a line parallel with the axis of the steam cylinder, and which, on their advance motion, strike against and carry forward the slide-valve. The arms are carried by springs by which their return motion is effected.

APPLICATIONS FOR LETTERS PATENT.

413.—Hunt, B., Lincoln's Inn, London, "Improvements in pipe-joints." A communication. (Complete specification.) Jan. 31, 1877.

422.—Kirkham, T. N., Westminster, Hulett, D., High Holborn, and Chandler, S., jun., and J., Newington Causeway, London, "Improvements in apparatus for the purification of gas." (Complete specification.) Feb. 1, 1877.

424.—Avery, C., Islington, London, "A new or improved rotary engine, applicable also for use as a liquid-meter and as a pump." Feb. 1, 1877.

431.—Pope, J., Folkestone, "Improvements in taps or cocks, which improvements are also applicable to regulating the flow of water to water-closets and other like receptacles." Feb. 1, 1877.

341.—Cotterell, F. J., Birmingham, "An improvement or improvements in sliding gaseliers or gas chandeliers." Jan. 26, 1877.
349.—Johnson, J. H., Lincoln's Inn Fields, London, "Improvements in pumps." A communication. Jan. 26, 1877.
351.—Harrison, C. W., Mansion House Chambers, London, "Improvements in apparatus for charging or impregnating atmospheric air with imflammable vapours." Jan. 27, 1877.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

3880.—Green, H., Preston, Lancs, "Improvements in coal gas scrubbers and apparatus for distributing liquid for other purposes." Oct. 7, 1876.
4540.—Dewrance, J., Borough, London, and Mallinson, J., Welwyn, Herts, "Improvements in cocks." Nov. 22, 1876.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

283.—Scott, H. Y. D., and Spence, J. B., "Improvements in the treatment of sewage and ammoniacal liquids." Jan. 22, 1874.
322.—Clark, A. M., "An improved process for eliminating the soluble principles contained in gases and vapours." Jan. 24, 1874.
342.—Lake, W. R., "An improved apparatus for maintaining a constant level of water in wet gas-meters, and for separating from vapour liquid held in suspension in the same." Jan 27, 1874.
348.—Whittingham, J., "Improved apparatus for manufacturing gas for illumination." Jan. 27, 1874.
350.—Clark, A. M., "Improved machinery for cutting and screw-threading pipes." Jan. 27, 1874.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

3741.—Walker, S., and Holt, E., "Improvements in steam pumping-engines." Dec. 24, 1869.
80.—Chameroy, E. A., "Improvements in means and apparatus for gauging or regulating the flow of water or other liquids." Jan. 11, 1870.
113.—Thorneloe, G., "A new flexible valve for regulating the flow of fluids in pipes, also used in apparatus for the manufacture of gas." Jan. 13, 1870.

Share List of Metropolitan Gas and Water Companies.

(*Corrected by Mr.* F. N. Golding, *Sun Court, Cornhill, from the latest Stock Exchange Quotations.*)

Number of Shares issued.	Amount per Share.	Name.	Amount paid up per Share.	Last Divd. p.Cent. p. Ann.	Latest Quotations.
	£	Gas Companies.	£ s. d	£ s. d	£
10000	20	Anglo-Romano . .	20 0 0	9 0 0	20—22
5000	20	Bahia (Limited). .	20 0 0	2 0 0	14—16
1000	20	Do., do., redeem.	20 0 0	2 0 0	25—27
1500	20	Do., 2nd pref. . .	20 0 0	7 10 0	21—22
40000	5	Bombay (Limited).	5 0 0	7 10 0	7¼—7¾
10000	5	Do., fourth issue.	4 0 0	7 0 0	5¼—5¾
10000	20	British (Limited) .	20 0 0	10 0 0	41—43
7500	20	Cagliari (Limited).	20 0 0	5 0 0	16—17
5500000*l.*	Sk.	*Commercial* . . .	100 0 0	10 0 0	215—218
70000	100	Do., 7 per cent. .	..	..	150—155
20000	20	Continental Union.	20 0 0	6 0 0	22½—23½
10000	20	Do., new	12 10 0	6 0 0	1¾—2¼pm
10000	20	Do., preference .	20 0 0	7 0 0	26—28
75000	Sk.	*Crystal Palace District*	100 0 0	10 0 0	215—220
125000	Sk.	Do., 7 per cent. .	100 0 0	7 0 0	150—155
50000	Sk.	Do., preference .	100 0 0	6 0 0	135—140
23406	10	European(Limited)	10 0 0	10 0 0	18¾—19½
12000	10	Do., new shares.	7 10 0	10 0 0	7—8pm.
35406	10	Do., new shares .	5 0 0	10 0 0	5—6pm.
3797770*l.*	Sk.	*Gaslight & Coke* A.	100 0 0	10 0 0	219—221
1000000*l.*	Sk.	Do. B.	100 0 0	4 0 0	86—90
30000	10	Do. 5 per ct. pref. conv.,3rd issue.	all	5 0 0	20¼—21
50000	10	Do. do., 4th do. .	6 0 0	5 0 0	8¾—9¼pm
50000	10	Do. do., 5th do. .	2 0 0	5 0 0	8¼—8¾
2000000*l.*	Sk.	Do. C 10 p.c. pref.	100 0 0	10 0 0	230—240
3000000*l.*	,,	Do. D do. do. .	100 0 0	10 0 0	230—240
1650000*l.*	,,	Do. E do. do. .	100 0 0	10 0 0	230—240
360000*l.*	,,	Do. F 5 do. do. .	100 0 0	5 0 0	114—116
600000*l.*	,,	Do. G 7½ do. do. .	100 0 0	7 10 0	165—170
1300000*l.*	,,	Do. H	100 0 0	7 0 0	153—155
6200	5	Georgetown,Guiana	5 0 0	5 0 0	..
10000	10	Hong Kong (Lim.)	10 8 0	10 0 0	16½—17½
56000	10	*Impri. Continental*	43 15 0	9 10 0	95—97
2500000*l.*	Sk.	*London*	100 0 0	10 0 0	215—218
1500000*l.*	Sk.	Do., 1st pref. . .	100 0 0	6 0 0	140—145
14450	Sk.	Do., 2nd pref. . .	100 0 0	6 0 0	..
4350	Sk.	Do., 3rd pref. . .	100 0 0	6 0 0	..
7622	25	Do., A shares . .	12 10 0	6 0 0	33—34
268050*l.*	All	Do., Debent. stk.	100 0 0	5*l.* & 6*l.*	..
15000	5	Malta and Mediterranean (Limited).	5 0 0	2 0 0	2½—3
6000	5	Do., preference .	5 0 0	7 10 0	5—5½
20000	5	Mauritius (Limited)	2 0 0	..	¼—1
25000	20	Monte Video (Lim.	20 0 0	8 0 0	19—19½
8000	10	Nictheroy, Brazil (Limited)	10 0 0	3 10 0	..
30000	5	Oriental (Calcutta).	5 0 0	9 10 0	8¼—8½
30000	5	Do., new shares .	3 0 0	9 10 0	2¼—2½
10000	5	Ottoman (Limited).	5 0 0	3 0 0	2½—3
17500	10	Pará (Limited) . .	10 0 0	7 0 0	5—5½
27000	20	*Phœnix*	20 0 0	10 0 0	42—44
3600000*l.*	100	Do., new	60 0 0	7 10 0	100—103
1440000*l.*	Sk.	Do., capitalized .	100 0 0	5 0 0	197—110
		Do., new, 1876. .	..	..	17—18pm
36000	20	Rio de Janeiro (L.)	20 0 0	10 0 0	33—35
7359	5	Singapore(Limited)	5 0 0	7 10 0	5¼—5¾
2000	5	Do., preference .	5 0 0	7 10 0	5¾—6¼
1500	32½	Shanghai	32 10 0	12 0 0	30—32
4000	50	*South Metropolitan*	50 0 0	10 0 0	110—112
4000	12½	Do.	12 10 0	10 0 0	27—28
20000	12½	Do., new shares .	9 0 0	10 0 0	12¼—13¾ pm.
15000	10	*Surrey Consumers.*	10 0 0	10 0 0	21—22
10000	10	Do., new	8 0 0	10 0 0	9¾—10¼p.
9000	4	United General . .	4 0 0	2 10 0	3—3½
1500	10	*Wandsw. & Putney*	10 0 0	10 0 0	19—20
1500	10	Do.	10 0 0	7 10 0	11—12
2957	10	Do.	10 0 0	7 0 0	..
993	10	Do.	3 0 0	7 0 0	..
16000	5	*West Ham*	5 0 0	10 0 0	8—8¼
10000	5	Do., new shares .	2 10 0	10 0 0	3—4
		Water Companies.			
12000	100	Chelsea	100 0 0	6 0 0	148—150
1800000	100	East London . . .	100 0 0	6 0 0	148—150
8000	50	Grand Junction . .	50 0 0	5 0 0	73—75
5840	25	Do., ¼ shares . .	25 0 0	5 0 0	36½—37½
2160	25	Do., new ditto; max. div.,7½ p.c.	25 0 0	5 0 0	32—34
547960	100	Kent	100 0 0	8 0 0	175—185
970	100	Lambeth	100 0 0	6 5 0	148—150
1161	100	Do.	100 0 0	6 5 0	148—150
442	100	New River	100 0 0	7 0 0	185—195
4475	100	Do.	60 0 0	7 0 0	59—59pm
400000	100	Do.,deb.sk.,4 p.c.	100 0 0	4 0 0	101—103
3036	100	Southwrk. & Vauxh.	100 0 0	4 0 0	112—4 xd
1296	100	Do., pref. stock .	100 0 0	5 0 0	112—114
	100	Do., D shares . .	100 0 0	4 0 0	108—111
		Do., 4¼ preference	100 0 0	4 10 0	106—108
	100	Do., new ordinary	..	4 10 0	..
1600	100	Do., new ord. No.1	40 0 0	4 10 0	106—108
12172	61	West Middlesex . .	61 0 0	6*l.* p.sh.	134—136

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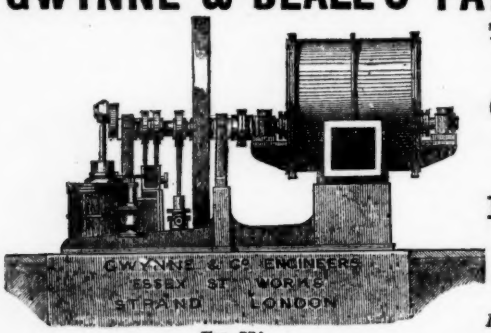

FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

GWYNNE & CO.
HAVE MADE THE
LARGEST AND MOST PERFECT
EXHAUSTING MACHINERY
Ever produced, and the most economical in working.

Prices and every information on application.

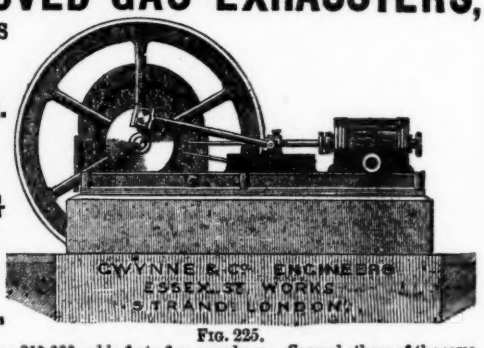

FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. Gwynne and Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,
CAN BE HAD ON APPLICATION TO
GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.
G. & Co. are now manufacturing for a London Gas Company three of their 210,000 *cubic feet Patent Gas Exhausters, and many of all sizes.*

D. BRUCE PEEBLES & CO.,
ENGINEERS,
FOUNTAINBRIDGE WORKS, EDINBURGH,
MANUFACTURERS OF **WET AND DRY GAS-METERS;**
Patentees and Sole Manufacturers of "PEEBLES' GAS-GOVERNORS,"
FOR STATIONS, DISTRICTS, DWELLING-HOUSES, AND PUBLIC LAMPS,
OF WHICH UPWARDS OF 90,000 ARE NOW IN SUCCESSFUL USE.
"These Lamp-Governors are so superior that they are likely to supplant all others."—*Dr. Wm. Wallace, F.R.S.E., F.C.S.*

WANTED, an appointment as Manager of Gas-Works, at home or abroad. Many years experience, and can prepare plans.
Apply to JOHN STEARS, HULL.

WANTED, an experienced Man as FOREMAN of the Gas-Works.
Applications to be made to the MANAGER, Corporation Gas and Water Works, BARROW-IN-FURNESS.

WANTED, Spent Oxide. The Sheffield Chemical Company, Attercliffe, are prepared to PURCHASE large or small quantities.
Address, with particulars, the Proprietors, HORNBY, FAIRBURN, AND CO.

TO GAS ENGINEERS.

WANTED, an energetic Gentleman, experienced in the commercial and practical management of Gas Engineering business.
Apply, stating terms, references, &c., to H. L., 4, BROAD SANCTUARY, S.W.

METER REPAIRER.

WANTED, at the Reading Gas-Works, a steady and experienced METER REPAIRER. Used to both Wet and Dry Meters. The situation is a permanent one.
Apply, stating age, experience, and wages required, to Mr. E. BAKER, Engineer.

CROYDON COMMERCIAL GAS AND COKE COMPANY.

WANTED, by the above Company, a sober, steady, and experienced MAIN and SERVICE LAYER. None but those accustomed to large mains need make application.
Apply, stating age and experience, with copies only of testimonials from present and last employer, to ROBERT WILSON, Chief Inspector, 22, George Street, CROYDON.

WANTED, by the South Shields Gas Company, an active, steady, practical Man, as SUPERINTENDENT of the Company's Jarrow Station. As it is in the course of erection, he must have had experience in the construction as well as management of Gas-Works. Salary to commence at £100 a year, with house, coal, and gas.
Copies only of testimonials to be sent, and application made, to the Company's Engineer,
W. J. WARNER.
South Shields, Jan. 25, 1877.

WANTED, by the Directors of the St. Anne's-on-the-Sea Gas Company, Lancashire, a competent person to take charge of a small Gas-Work. The works are in course of construction. He will be required, in addition to the management of the works, to lay gas-mains, connect service-pipes and meters, and make himself generally useful. State salary required.
Applications, with testimonials, to be sent in sealed and addressed to the Chairman of the Gas Company, not later than Monday, the 8th day of February next.
By order,
W. J. NUTTER, Secretary.
St. Anne's-on-the-Sea, Lancashire, Jan. 25, 1877.

ADVERTISER is open for engagement as ACCOUNTANT & BOOKKEEPER. Thoroughly understands double entry, and general routine of Water-Works Office, including rental, collecting, transfers of shares, &c. Unexceptional references.
Address No. 344, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE, a Set of 6-in. Vertical CONDENSERS, with tar-box and all connexions complete.
May be seen, and price obtained, on application to the Southbank and Normanby Gaslight and Coke Company, Limited, Southbank, YORKSHIRE.

APPOINTMENT WANTED.

THE Son of a Gas Engineer desires an APPOINTMENT as an ASSISTANT to a Manager or Engineer of Gas-Works. Is 20 years of age. Five years experience in keeping carbonizing accounts, using photometer daily, and testing for sulphur compounds, &c. Is a fair draughtsman. Moderate salary.
Address No. 337, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BOROUGH OF BRADFORD.

CHIEF CLERK IN GAS DEPARTMENT.

THE Bradford Corporation require the services of a thoroughly competent person to act as CHIEF CLERK in the Gas Department. Salary £200 per annum. Preference will be given to one who has held a similar situation.
Applications, stating age of the applicant, accompanied by testimonials, endorsed "Chief Clerkship," and addressed to the Chairman of the Gas Supply Committee, to be forwarded to me on or before Saturday, the 17th inst.
By order,
W. T. M'GOWEN, Town-Clerk.
Town-Hall, Bradford, Feb. 3, 1877.

PAMPHLET ON GAS.

COOKING AND HEATING.
HINTS ON GAS-BURNERS, &c.

For GAS COMPANIES to distribute to their Gas Consumers.

Specimen Copy by post Threepence, from the Author,
MAGNUS OHREN, Gas-Works, Sydenham, S.E.

150-LIGHT Dry Gas-Meter for Sale, by Glover, in good condition.
Address H. T., 16, Warwick Street, DEPTFORD, S.E.

FOR SALE, as they stand, four Dry- Lime PURIFIERS, 6 feet square in the clear, with grids, valves, and connexions complete.
Apply to JOHN DAVIES, Manager, NANTWICH.

BOILERS.

FOR SALE, Cheap, Two 5-h.p. Cornish BOILERS, in good condition. May be seen at the Reading Gas-Works.
Particulars can be obtained of Mr. E. BAKER, Engineer.

THE Kingston-on-Thames Gas Company have FOR SALE, cheap, two 12-ft. square PURIFIERS, with strong wrought-iron girder and lifting apparatus complete; also two cast-iron SCRUBBERS, 4 ft. diameter, 24 ft. high, with a quantity of 9-inch rack valves and connexions.
H. F. PACKHAM, Engineer and Manager.

SHREWSBURY GAS COMPANY.

THE Directors are desirous to receive TENDERS for the surplus TAR and AMMONIACAL LIQUOR produced at their works for a term of three years, from July 1, 1877. Particulars as to quantities made may be had on application.
Tenders to be sent in separately for Tar and Water, at per ton of 2240 lbs., before the 20th of February next.
By order,
Jan. 27, 1877. S. B. DARWIN, Secretary.

TO GASHOLDER MAKERS.

THE Directors of the Rastrick Gas Com- pany are desirous of receiving TENDERS for the construction and erection of a Single-Lift GASHOLDER, 90 ft. diameter and 20 ft. deep.
Plans and specifications may be seen at the Company's Offices, Bird's Royd, Rastrick, on and after Thursday, the 8th day of February, 1877.
Sealed tenders endorsed "Tender for Gasholder," to be sent to the undersigned not later than Saturday, the 17th day of February, 1877.
The Directors do not bind themselves to accept the lowest or any tender.
JOHN TETLOW, Secretary.
Rastrick, Jan. 24, 1877.

Now ready, price One Shilling, No. 3 (to be continued Monthly) of

A TREATISE ON THE SCIENCE & PRACTICE
OF THE
Manufacture and Distribution
OF
COAL GAS.

LONDON: WILLIAM B. KING, 11, BOLT COURT, FLEET STREET,
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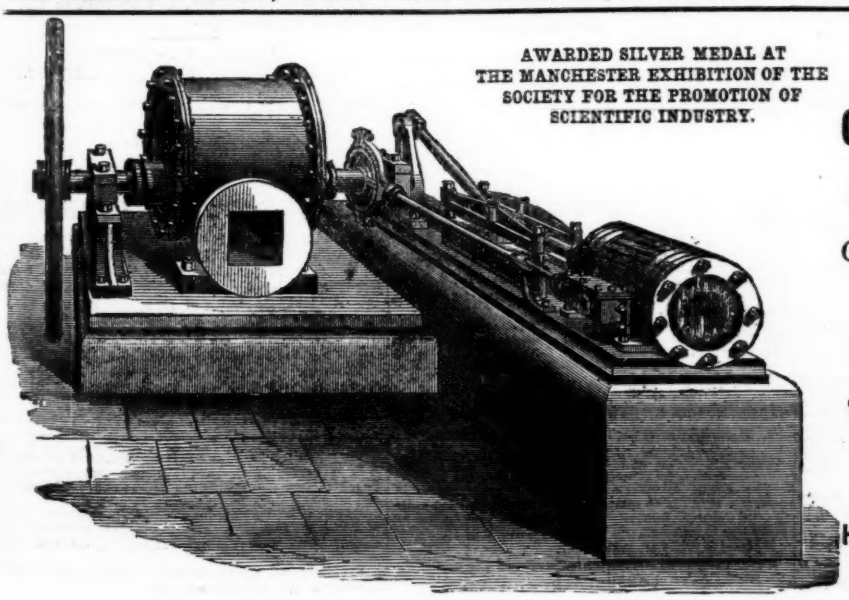
For the convenience of persons resident in remote districts, arrangements have been made by the Publisher to forward the "Treatise" by Post, securely packed on a wooden roller, at the cost of the number and postage only—viz., 1s. 2d. Monthly, or 7s. for the Half Year.

THE THAMES BANK IRON COMPANY,
(Successors to LYNCH WHITE,)
SUPPLY FROM STOCK
CAST-IRON RETORTS, SOCKET-PIPES for GAS or WATER PURPOSES, FLANGE-PIPES for STEAM, RAIN-WATER PIPES and GUTTERS, HOT-WATER PIPES and BOILERS, and all requisite Connexions for same; also LAMP-COLUMNS, LAMPS, WROUGHT FRAMES, WROUGHT-IRON TUBING, &c., &c.
All kinds of Gas-Works Apparatus and General Castings made to Pattern or Drawing.
ADDRESS—
OLD BARGE WHARF, UPPER GROUND STREET, LONDON, S.E.



AWARDED SILVER MEDAL AT THE MANCHESTER EXHIBITION OF THE SOCIETY FOR THE PROMOTION OF SCIENTIFIC INDUSTRY.

BEALE'S
Improved Patent
GAS-EXHAUSTERS
WITH
ENGINES COMBINED.
Sole Makers,
GEORGE WALLER & CO.

Makers of
ENGINES, EXHAUSTERS,
INDEX and DISC GAS-VALVES,
HYDRAULIC MAIN VALVES,
BYE-PASS VALVES,
TAR, LIQUOR, and other PUMPS,
SCRUBBERS and PURIFIERS,
CONDENSERS, BOILERS, &c.

PHŒNIX ENGINEERING WORKS,
HOLLAND STREET, S.E.,
AND
STROUD, GLOUCESTERSHIRE.

THE Swansea Gaslight Company have for immediate SALE, the following Plant:—
A 6-h.p. Patent Trunk Engine. (Beale.)
Exhauster to pass 15,000 feet per hour. (Beale.)
An 8-h.p. Grasshopper Engine. (Easton and Amos.)
Exhauster, 20,000 ft. per hour. (Beale.)
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Wrought-iron Condenser, six vertical Legs, 30 ft. high, 24 in. by 6 in., with tar-boxes, dips, and syphons.
Wrought-iron Scrubber, 5 ft. diameter, 20 ft. high.
A set of four cast-iron Purifiers, 12 ft. square by 5 ft. deep, with galvanized wrought-iron covers, lifting apparatus, four tiers of wooden sieves, 10-in. connexions and valves.
May be seen at the Gas-Works, Swansea. The whole in perfect working order; replaced by plant of larger dimensions.
Further particulars may be obtained on application to Mr. THORNTON ANDREWS, SWANSEA.

THE Gas Committee of the Leeds Corporation are prepared to receive TENDERS for the supply of Iron-Cased WET-METERS.
Tenders to be addressed to the Chairman of the Gas Committee, Town-Clerk's Office, Town-Hall, not later than Tuesday, the 13th inst, endorsed "Tender for Meters."
Forms may be had on application to Mr. H. Woodall, Engineer.
The Committee do not bind themselves to accept the lowest or any tender.

By order,
C. A. CURWOOD, Town-Clerk.

Leeds, Feb. 3, 1877.

TO GASHOLDER MAKERS.

THE Directors of the Redditch Town and District Gas Company, Limited, are open to receive TENDERS for the construction and erection of a GASHOLDER, 57 ft. in diameter and 18 ft. deep, at their Works, Redditch.
Drawings and specifications of which may be seen by application to the Manager at the Works.
Sealed tenders must be sent in to the Directors, endorsed "Tender for Gasholder," not later than the 6th day of March next.
The Directors will not necessarily accept the lowest or any tender.
Gas-Works, Redditch, Feb. 3, 1877.

BOROUGH OF HALIFAX.

TO BRASS AND IRON FOUNDERS.

THE Gas-Works Committee of the Cor- poration are prepared to receive TENDERS for supplying Brass GAS-COCKS and Wrought-Iron TUBING for a period of Twelve months.
Forms of tender and any further particulars may be obtained on application to Mr. Wm. Carr, Manager, Gas-Works, Halifax; and tenders, properly endorsed, must be sent to me on or before Thursday, the 8th day of February, 1877.

By order,
A. C. FOSTER, Town-Clerk.

Town-Hall, Halifax, Jan. 26, 1877.

TO BUILDERS AND GAS ENGINEERS.

THE Gas Committee of the Corporation of Salford invite TENDERS for the erection of a New PURIFYING-HOUSE at the Regent Road Works, and for the supply and fixing of machinery connected with it.
Plans may be seen and all particulars obtained from the engineer, Mr. Samuel Hunter, Lamb Lane Gas-Works, Salford.
Tenders must be delivered to me on or before the 17th of February next, endorsed "Purifying-House, &c., Contract."
The Committee do not bind themselves to accept the lowest or any tender.

By order,
CHRIS. MOORHOUSE, Town-Clerk.

Town-Hall, Salford, Jan. 26, 1877.

LITTLEBOROUGH GAS COMPANY.

TO IRONFOUNDERS.

THE Directors of the above Company are prepared to receive TENDERS for the supply of the following Cast-Iron PIPES with turned and bored joints, to be delivered at Littleborough Station:—

	Weight per Yard.
300 yards 15 in., in lengths of 9 ft. each . .	280 lbs.
600 yards 10 in., in lengths of 12 ft. each . .	168 lbs.

Any excess in the above weights will not be paid for.
Further particulars may be obtained on application to the undersigned, to whom tenders are to be sent, and endorsed "Tender for Gas-Pipes," on or before Friday, the 16th of February.
The Directors do not bind themselves to accept the lowest or any tender.

By order,
JOHN COCKCROFT, Manager.

Littleborough, near Manchester, Feb. 1, 1877.

BOROUGH OF PORTSMOUTH WATER-WORKS.

TENDERS FOR CAST-IRON PIPES.

THE Directors of the Borough of Ports- mouth Water-Works Company are prepared to receive sealed TENDERS for the supply of about 1125 tons, more or less, of 12-inch Cast-Iron PIPES, and about 10 tons of IRREGULAR CASTINGS, with the right of the Company to increase the quantity to 2250 tons of the same sized pipes, and to 20 tons of Irregular Castings, in their discretion, on reasonable notice.
Copy of conditions of contract, specification, and form of tender may be obtained at the Secretary's Offices, 31, St. Thomas Street, Portsmouth, or at the Office of Messrs. Joseph Quick and Son, C.E., No. 29, Great George Street, Westminster, on and after Friday, the 2nd of February next, and tenders must be delivered at the Company's Office, at Portsmouth, at or before Ten o'clock in the forenoon of Friday, the 16th day of February next.
The tenders to be addressed to the Directors, under cover to the Secretary, and marked "Tender for Cast-Iron Pipes."
The Company do not pledge themselves to accept the lowest or any tender.
Dated this 26th day of January, 1877.

R. W. FORD, Secretary.

BARNET DISTRICT GAS & WATER COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY GENERAL MEETING of the PROPRIETORS of the above Company will be held at the Guildhall Tavern, Gresham Street, in the City of London, on TUESDAY, the 27th day of February, 1877, at Two o'clock in the afternoon precisely, to receive the Report of the Directors and the Accounts for the half year ending the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor, to fix the remuneration of the Directors, and to transact the general business of the Company.
The Transfer Books will be closed from the 15th to the 27th inst., both inclusive.

By orde of the Board,
ALFRED LASS, Secretary.

Offices, 30, Gracechurch Street, London, E.C.,
Feb. 2, 1877.

LLANELLY GAS-WORKS.

TO CONTRACTORS, BUILDERS, AND OTHERS.
CONTRACT No. 1.

THE Directors of the Llanelly Gaslight Company are prepared to receive TENDERS for the excavating and building of a Brick TANK, 92 ft. diameter and 25 ft. deep.
Drawings and specifications may be seen on application at the Gas-Works, Llanelly.
Sealed tenders to be sent in on or before Friday, March 2nd, addressed to the Chairman of the Gas Company, and endorsed "Tender for Tank."
The Company do not bind themselves to accept the lowest or any tender.
Further particulars may be obtained from the Engineer.

By order,
HENRY R. MARTIN, Engineer.

LLANELLY GAS-WORKS.

TO GASHOLDER MAKERS AND OTHERS.
CONTRACT No. 2.

THE Directors of the Llanelly Gaslight Company are prepared to receive TENDERS for the supplying, fixing, and completion of a GASHOLDER, 88 ft. diameter and 25 ft. deep, with all necessary guides, wheels, columns, and girders complete, to be erected at their Works, Llanelly.
Drawings and specifications may be seen on application at the Gas-Works, Llanelly.
Sealed tenders to be sent in on or before Friday, March 2nd, addressed to the Chairman of the Gas Company, and endorsed "Tender for Gasholder."
The Company do not bind themselves to accept the lowest or any tender.
Further particulars may be obtained from the Engineer.

By order,
HENRY R. MARTIN, Engineer.

SKELMERSDALE GAS-WORKS.

CONTRACT No. 3.

THE Skelmersdale Local Board are pre- pared to receive TENDERS for the supplying and delivering at Skelmersdale Station (Lancashire and Yorkshire Railway, Rainford and Ormskirk Branch) of about 10,000 lineal yards of Cast-Iron GAS-MAINS, with turned and bored joints, and special pipes in connexion therewith.
Copy of specification, schedule, and form of tender, and all information, may be obtained (on payment of two guineas, which will be returned on receipt of a *bonâ fide* tender) on application to the Engineers to the Board, Messrs. Goodison, Atkinson, and Forde, Orange Court, 35a, Castle Street, Liverpool.
Sealed and endorsed tenders to be sent to the Clerk's Office on or before the 12th day of February.
The Board do not bind themselves to accept the lowest or any tender.

WILLIAM PARR, Solicitor, Clerk to the Board.

Ormskirk, near Liverpool.

MANCHESTER CORPORATION GAS-WORKS.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee are prepared to receive TENDERS for the purchase of the whole or portion of the GAS TAR to be produced at their Gaythorn and Rochdale Road Works for the term of one or more years, as may be agreed upon, commencing on March 1, 1878. The total quantity that will be produced during the first year is estimated at 15,000 tons or thereabouts.
Sealed tenders, addressed to the Chairman of the Gas Committee, City Hall, and endorsed "Tender for Gas Tar," must be delivered at this Office on or before the 20th day of March next.
The Committee do not bind themselves to accept the highest or any tender.
Further particulars as to conditions of contract, and forms of tender may be obtained on application to Mr. Jackson, at the Gas Office.

By order of the Gas Committee,
JOSEPH HERON, Town Clerk.

Gas Office, City Hall, Manchester, Jan. 27, 1877.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.
Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

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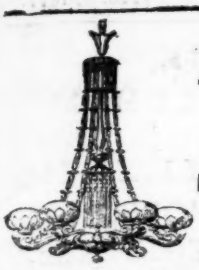

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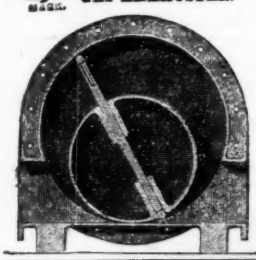

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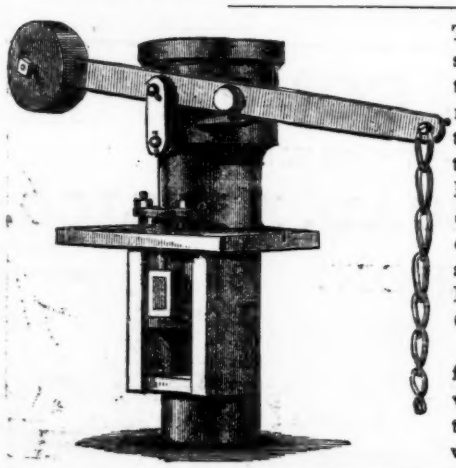

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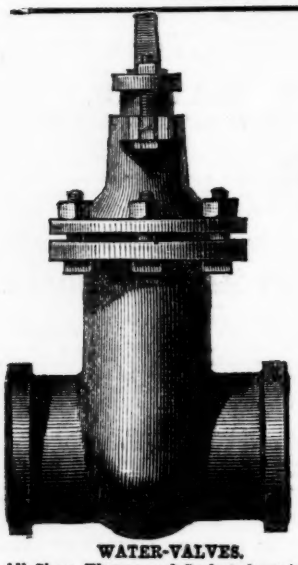

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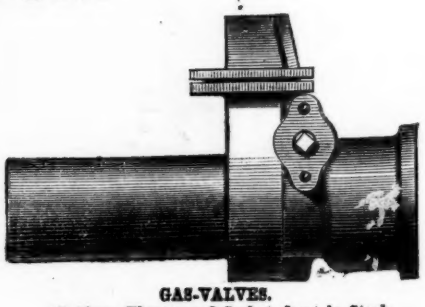

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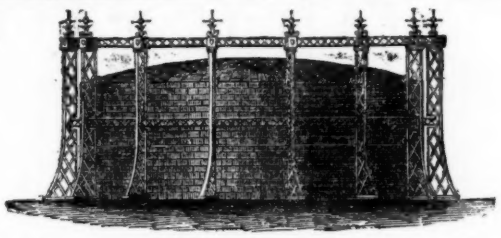
SANITARY PIPES, CHEMICAL PIPES, &c.

All made of the best quality of Fire-Clay, wrought from Whickham Colliery.

J. S. & Sons having during the past year erected large Works at Derwenthaugh, in addition to their old Works at Gateshead-on-Tyne, are in a position to supply large orders with the greatest despatch.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

WHITEFRIARS STREET, LONDON, E.C.,

HYDRAULIC ENGINEERS,

AND MANUFACTURERS OF

PUMPING MACHINERY of every Description.

SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF

BLAKE'S PATENT STEAM-PUMPS,

More than 10,000 in use,

ESPECIALLY ADAPTED FOR USE IN GAS AND CHEMICAL WORKS, FOR PUMPING TAR, WATER, AMMONIACAL LIQUOR, ACIDS, &c.

The following are some of the prominent advantages of the BLAKE PUMP:—

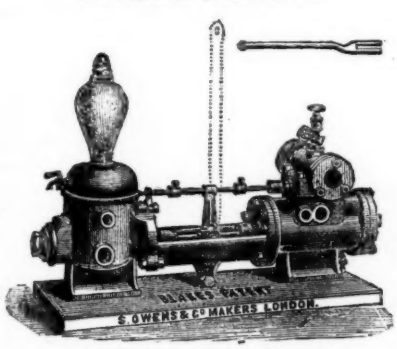
It will start at any point of stroke.

It has no dead point.

It works fast or slow, with the same certainty of action.

It is economical. Has a lead on the slide-valve.

It is compact and durable.



It is interchangeable in all its working parts.

It will deliver more water than any other pump.

It is made of best materials in the most workmanlike manner.

Can be worked at 20 strokes per hour, or 200 strokes per minute.

This Illustration represents Boiler-Feed Pumps, Sizes Nos. 1, 2, and 3, with Hand Lever for working Pump when Steam is not available.

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Of all Dimensions for Gas-Works,

GLASS-HOUSE POTS & CRUCIBLES

Of every kind.

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SZERELMEY STONE LIQUID,

Which waterproofs and casehardens every kind of masonry, and

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"The only permanent preservative against rust," having enjoyed the approval of the most eminent authorities, including SIR CHARLES BARRY, SIR R. I. MURCHISON, PROFESSOR FARADAY, "THE TIMES," "PALL MALL GAZETTE," "ENGINEER," "BUILDING NEWS," "IRON," &c.

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"SELLARS' CEMENT"

PREVENTS WASTE OF GAS FROM RETORTS;

SAVES CLAY RETORTS FROM DESTRUCTION BY FIRE;

GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;

And PREVENTS ALL POSSIBLE LOSS of GAS FROM LEAKAGE.

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THE GAS CEMENT WORKS,

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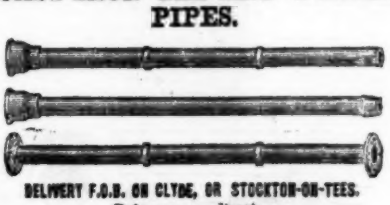

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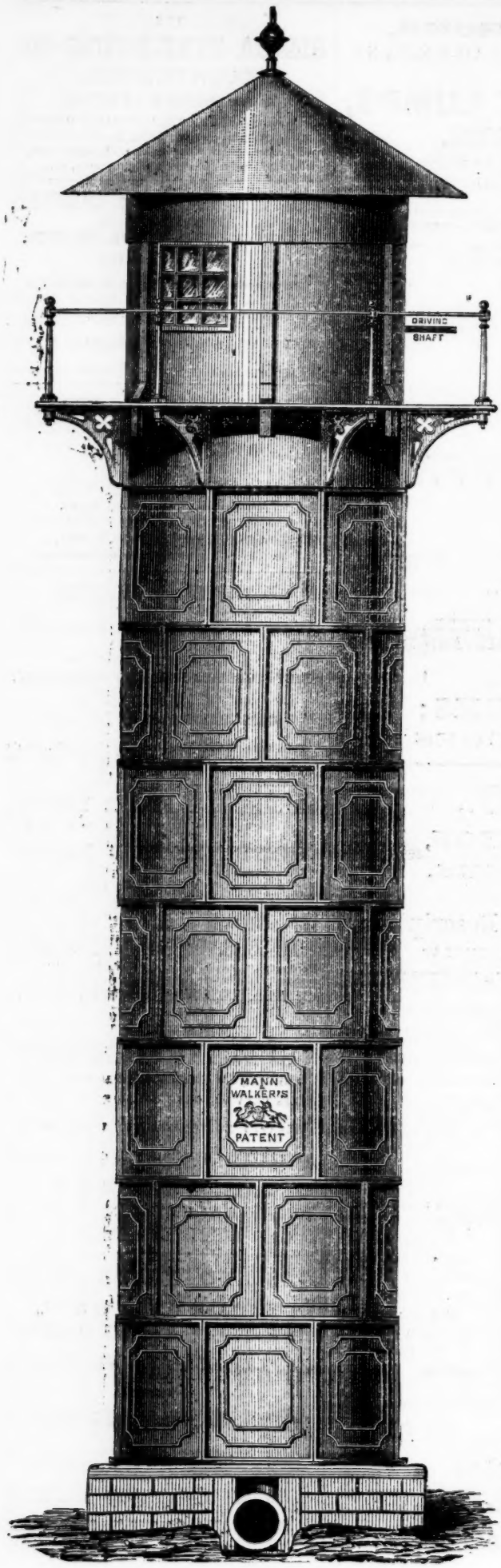

C. & W. WALKER,
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MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the important results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

They are, in all cases, constructed under guarantees to perfectly perform their work. They are now extensively used in the largest gas-works of London and the chief cities of Europe, the number in use exceeds **one hundred,** and their perfect efficiency and profit to a gas company have been fully established with every variety of coal used in Europe. References can be given to the largest gas-works in Europe.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

J. EDMUNDSON & CO.,
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ROUND STATION-METERS,
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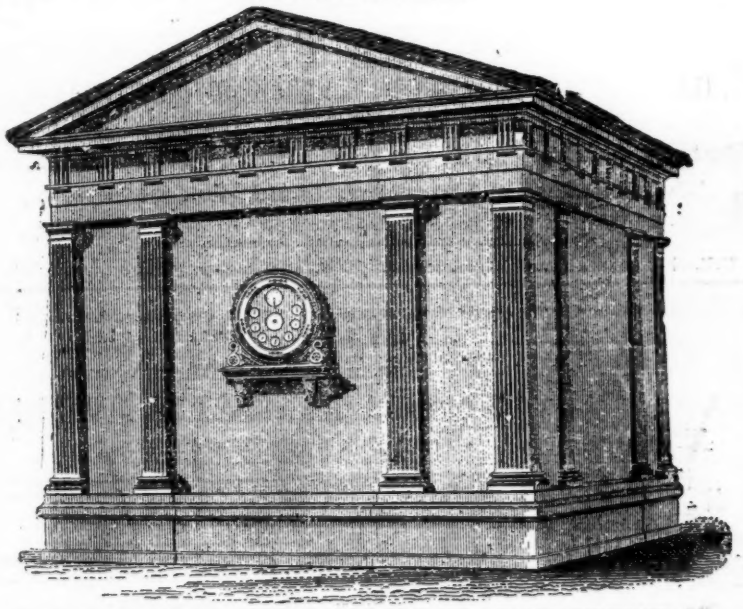

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WITH PLANED JOINTS.
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GAS COOKING APPARATUS.
Home and Foreign Orders promptly attended to.
All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.
Orders almost invariably despatched on the day of receipt.
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Keep in London and at their works large stocks of PIPES and CONNEXIONS (1¼ to 36 inches in diameter); also make and supply Retorts, Tanks, Columns, Girders, Special Castings required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
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CLASS X.
PRIZE MEDAL
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THROCKLEY,
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Our New and Choice Designs for the above, with prices, are forwarded to any part of the world on receipt of twelve stamps. Estimates for work at home or abroad.
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WOOD PURIFIER SIEVES,
Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.
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CATOPTRIC
LAMPS.
The NEW PATTERN
Is now placed throughout
CHEAPSIDE.
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STRAND.

ALBERT GAS COAL.

THE DERBYSHIRE
SILKSTONE COAL COMPANY,
LIMITED,
CAN OFFER A
GAS COAL
Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	10,775
Weight of coke in lbs. per ton of coal	1,465

ANALYSIS AND PRICES ON APPLICATION TO
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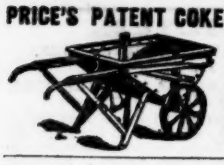
ALBERT COLLIERY, NEWBOLD, NEAR CHESTERFIELD.

PRICE'S PATENT COKE & COAL BARROW



effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. Price, Inventor and Patentee, Gas-Works, Hampton Wick, Middlesex.

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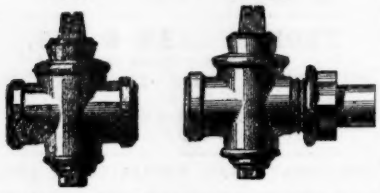
CAST-IRON GAS-MAIN COCKS,

WITH PATENT WHITE METAL PLUGS.

TRADE (L) MARK.

No. 758. No. 759.



The bodies of these Taps are made of iron, black or galvanized, and the plugs of patent metal. They are warranted not to set fast or corrode, as do Iron or Brass Cocks; will always work easily; are strong, well made, durable; of little or no intrinsic value, and therefore not likely to be stolen; and the prices as stated below are (especially upon the larger sizes) fully 50 per cent. less than Brass Cocks.

	½	¾	1	1¼	1½	2-inch.
No. 758, with inside screws for iron pipe, black	2/0	3/0	4/4	6/6	7/6	12/0 each.
No. 759, with union on one end screwed inside for iron pipe, black .	2/9	3/10	5/4	8/0	9/0	15/6 each.
Nos. 758 and 759, galvanized	0/3	0/4	0/6	0/8	0/10	1/4 extra.

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These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Wagon Works, and the Paint Trade generally. They are the BEST PROTECTORS of WOOD, CEMENT, and IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to iron. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only to be thinned down for use in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
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Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead Colour.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.

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A great variety of Colours ready mixed for the brush are also always kept in Stock, in 3 lb., 7 lb., 14 lb., and 28 lb. cans.

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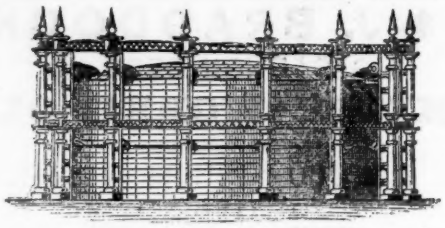

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MANUFACTURERS OF GASHOLDERS,

GAS APPARATUS OF EVERY DESCRIPTION,

Including Improved

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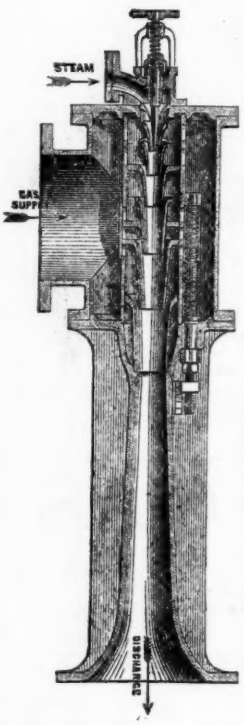

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IMPROVED CLELAND'S PATENT.

Small Cost—Compactness—Perfectly Self-Acting—Self-Regulating—Self-Cleansing—No Steam-Engine—No Attention—No Extra Room Required—No Wear and Tear—No Noise—No Oscillation in Vacuum, or Back Pressure.

UPWARDS OF 200 IN USE.

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Horsham Gas Co.	Brentford Gas-Works.	Harrogate Gas Co.
Epsom and Ewell Gas Co.	Burnley Gas-Works.	Hertford Gas Co.
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Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL
Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

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Yields 13,320 cubic feet of 32·5-candle gas per ton.
Prices and full Analyses on application.

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POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.
One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.
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PLUTONIC CEMENT,
For Jointing and Repairing Retorts and Ovens both in and out of Action.
Used in the principal London and Provincial Gas-Works as a great aid to the economical production of Gas.
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The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.
JAMES M'KELVIE,
CANNEL COAL MERCHANT,
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Established 1840.

LESMAHAGOW CANNEL COAL.

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SOLE AGENT FOR
THOMAS BARR'S LESMAHAGOW MAIN CANNEL.
Quotation and Analysis forwarded on application.

REDHEUGH COLLIERY,
NEWCASTLE-ON-TYNE,
The Owners of the above Colliery are now prepared to ship their
FIRST-CLASS GAS COALS,
F.O.B. TYNE DOCKS.
By analysis, these Coals give 10,000 cubic feet of gas per ton, with an illuminating power equal to 14·5 sperm candles, and a large per centage of first-class Coke.
Buyers can rely upon the Coals being fresh wrought, and free from pyrites, band, &c.
For prices, &c., apply to
ROBT. HINDHAUGH,
FITTING OFFICES, NEWCASTLE-ON-TYNE.

G. J. EVESON,
GAS COAL MERCHANT,
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Delivery per Rail to any Part.

BIRTLEY IRON WORKS,
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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
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THE ORIGINAL MANUFACTURER OF
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GAS PURIFIERS & SCRUBBERS.
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THE SILKSTONE & DODWORTH COAL & IRON COMPANY, LIMITED,
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REAL OLD SILKSTONE GAS COAL.

JAMES PATERSON, Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—
"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."
The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.
PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

MESSRS. NEWTON, CHAMBERS, & CO.,
THORNCLIFFE IRON-WORKS AND COLLIERIES,
NEAR SHEFFIELD,
STRONGLY RECOMMEND A TRIAL OF THEIR
CELEBRATED SILKSTONE GAS NUTS.

Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.
Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.
These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.
APPLICATIONS FOR PRICES, &c., TO BE SENT DIRECT TO THE COLLIERY, AS ABOVE.

NEW PATENT WET GAS-METER,

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DESCRIPTIONS AND ILLUSTRATIONS ON APPLICATION,

F. W. HARTLEY, MANAGER,

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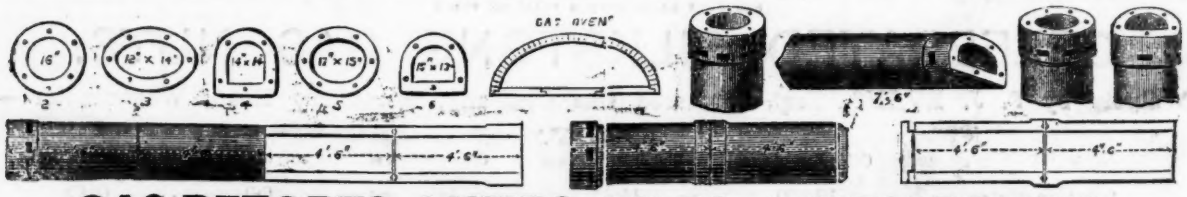

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London: Printed by WILLIAM BOUGHTON KING (at the office of Clayton and Co. 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, February 6, 1877.